Indian Archaeology

1991-92 — A REVIEW







INDIAN ARCHAEOLOGY 1991-92 — A REVIEW

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Adam: 1, *view of excavation;* 2-3, *bone comb (obv. & rev), Period V*

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PREFACE

The present issue *of Indian Archaeology 1991-92 —A Review* is being published after a gap of one full year, since the last issue appeared in June 1995. Despite requests made by my predecessors in the earlier issues of the *Review,* most contributors fail to send the material within the scheduled date specified, and many do not even conform to the established format and style. As a result, contributors have to be often reminded, which delay matters, and editing takes more time than is normally required. I would, therefore, again request all contributors of the *Review,* to send their material well in time, and as per format prescribed. I would also like to request my colleagues in the Survey in particular, to bear in mind the need for timely submission of their reports, while ensuring quality of content. On our part, we shall make every effort to clear the backlog of this important publication.

I thank the State Governments and their respective Departments of Archaeology and Museums, Universities and Research institutions, Museums containing archaeological collections located in different parts of the country, the Physical Research Laboratory, Ahmedabad, and the Birbal Sahni Institute of Palaeobotany, Lucknow, and the different branches and circles of the Archaeological Survey of India who have contributed to the *Review.*

The present issue of the *Review* contains information on a wide gamut of activities in the field of archaeology covering exploration and excavation, epigraphy, numismatics and treasure trove, architectural survey, radiocarbon dates, palaeobotanical and pollen-analytical studies, museums, preservation of monuments and archaeological sites, archaeological chemistry, archaeological gardens and also a brief account of the chemical cleaning and structural conservation and preservation of Angkor Vat, which was executed by the Survey during the period.

While the present issue of the *Review* contains information on a wide sweep of archaeological activities in the country, I would like to mention in particular some of the important excavations included in the *Review* which are : (i) Taradih, Maner and Kolhua in Bihar; (ii) Padri, Pithad and the famous Harappan site of Dholavira in Gujarat; (iii) Anangpur and Kunal in Haryana; (iv) Hampi and Budihal in Karnataka; (v) Maihar in Madhya Pradesh; (vi) Adam, Shirkanda and Arambha in Maharashtra; (vii) Kanchipur in Manipur, (viii) Vadagokugiri in Meghalaya; (ix) Barabati fort, Lalitagiri, Golbai Sasan and Manamunda in Orissa; (x) Arikamedu in Pondicherry; and (xi) Jainal-Naula, Ladyura and Imlidih-Khurd in Uttar Pradesh. Several new inscriptions in Sanskrit and Dravidian languages, as well as in Arabic and Persian are also reported in the *Review.*

Scholars and interested readers will, I am sure, find this an informative and useful edition of the *Review.*

I would like to thank my colleagues B.M. Pande, Director, C. Dorje, Superintending Archaeologist and Arundhati Banerji, Deputy Superintending Archaeologist and the other staff in the Publication Section of the Survey for their efforts in bringing out this issue.

B.P. Singh
Director General

9 September 1996

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I. EXPLORATIONS AND EXCAVATIONS

ANDHRA PRADESH

1. EXPLORATION AT PENNER, DISTRICTS CHITTOOR AND NELLORE.— G. Kamalakar of Birla Archaeological & Cultural Research Institute, Hyderabad, and his team explored parts of Nellore and Chittoor districts.

The exploration was undertaken with the objective of identifying fossil strands in the Pulicat lake area and correlating them with the fluvial deposits and cliff sections of the Penner river.

The Pulicat lake area with extensive plantation beyond its western shore and distantly overlooked by the Satyavedu, Nagari and Nagalapuram hills is ideally suited for fossil marine strands. An extensive (+8 m) strand was identified between Thada and Nayudupet, along the National Highway No. 5. An older strand 20 m high above the MSL was observed on the route to Satyavedu between Bathulavallam and Thageli. Both the strands are now lateritised the 20 m strand to vermiform and the 8 m high strand to pisolithic from Thageli to Rallakuppam. There is a steady rise of land level appearing as if they were eroded terraces.

2. EXCAVATIONS AT GUDISALA, DISTRICT KARIMNAGAR.— The Department of Archaeology and Museums, Government of Andhra Pradesh, unearthed a temple-complex, foundation of an enclosure wall, gateway and a revetment wall of a *pushkarini* at Gudisala, situated about 30 km away from the Warangal-Karimnagar highway.

3. EXPLORATIONS IN DISTRICT MAHBOOBNAGAR.—- D.R. Raju and N. Chandramouli of Telugu University, Srisailam, in the course of explorations in the Amrabad region of district Mahboobnagar discovered the Lower Palaeolithic sites at Motukuruva Vagu, Desamkuruva Vagu, Selamala Vagu, Bondakuruva Vagu, Padra, Kondavanipalli Tanda, Rayalagandi Tanda and Vankeswaram.

Motukuruva Vagu (MKV) (16° 21' 47" N; 78° 49' 55" E; 600 m AMSL) is 1 -5 km south of Amrabad at the foothills about 2 km east-north-east of Desamkuruva Vagu. A hill stream coming from the hill ranges at Amrabad, which flows into Mandavagu has cut across the granitic bedrock which is weathered. The artefacts are washed down from the granitic surface into the bed of the *nullah* which is 1 m to 2 m wide. Overlying the granitic bed rock there is 50 cm to 1 m thick red earth and at times consolidated calcium carbonate nodules. The artefacts from this site include handaxes, cleavers, cores, bifacial and unifacial points, scrapers both simple and levalloisian flakes, quartzite cobbles, pebbles, chunks and blocks of stones. The site extends right from the foot hills into the cultivated fields and measures about 1 km x 1 km but the artefacts are scattered in the cultivated fields far beyond the *nullah.*

Desamkuruva Vagu (DKV), [1]6° 21' 21" N; 78° 49' 03" E; 600 m AMSL), is about 1 km from Selamalavagu (SLV) located 2 km (aerial distance) south of the Mannanur-Amrabad route and about 3 km south-west of Amrabad.

A few small freshets criss-cross and lead into the cultivated fields. The slopy plain is replete with pebbles, cobbles and blocks of quartzite and some on quartz. Some of the fresh handaxes and cleavers are found scattered in the eroded gully surfaces. A few specimens, buried or partially exposed, have lime encrustation on them. There are a few weathered specimens also which are probably exposed for a very long time. The gully bed which is filled with sand is about 1 -5 m wide. On the weathered bed-rock, there is a 20 cm thick red sandy clay overlying which is a pebbly boulder deposit in which tools are found. The artefacts are spread over an area of 200 m x 100 m.

Selamala Vagu (SLV) 16° 21' 15" N; 78° 48' 36" E; 620 m AMSL), is 2 km south-east of Kottapalli village, about 2 km east of Turakapalli and about 2-5 km south-east of Venkateswarla bhavi all of which lie within 2-5 km south of Mannanur-Amrabad road at the foot of the hills running parallel to this road. It is 3-5 km south-west of Amrabad.

Several rain gullies originating from the hills cut across a gentle slopy plain and drain into the irrigation tank about 1 km north-west of the foothills. Handaxes and cleavers lie buried in the lateritic deposit about 30 cm to 40 cm below the surface. Fine quartzite of grey and brown shades is available in plenty. Apart from handaxes and cleavers and other associated artefacts, a few fine blades on quartzite are also noticed. On the whole, the industry appears to be of late Acheulian phase.

Bondakuruva Vagu (BKV) (16° 21'49" N; 78° 51' 18" E; 600 m AMSL), is about 3 km south-east of Amrabad at the foothills and about 2 km south-west of Madhavanipalli. There is an irrigation tank north of the site and a shallow depression which is converted into an irrigation tank, 2-5 km north of the site. A small gully originating from the hills has cut across and exposed fresh artefacts on the calcareous *kankar* bed. Overlying the granitic bed-rock there are very fine handaxes, cleavers, flakes and other artefacts spread over an area of 500 m x 500 m.

Padra (PDR) (16° 21' 15" N; 78° 52' 20" E; 592 m AMSL) is 2-5 km north of Rayalagandi Tanda. There is an irrigation tank 1.4 km north-north-west of Padra. A small tunnel cutting across the fields near the fort in ruins has exposed a few Acheulian artefacts. Here the horizon of the tools is clear. They are sitting right on the top of the weathered granite surface. When the top soil, which is 80 cm in thickness gets eroded, the tools are washed into the tunnel bed.

Kondavanipalli Tanda (KPT) (16° 25' 03" N; 78° 52' 35" E; 600 m AMSL) is 0.5 km south-south-east of Tanda. There is an irrigation tank 1.5 km north-north-west of the site. About 100 m from the newly-dug well and about 500 m from the hills in the agricultural fields is a small strip of 150m X 10m. The top mantle which is greyish sandy soil is stripped off by erosion and has exposed a cluster of artefacts on weathered granitic bed-rock. There are quartzite blocks, cobbles, chunks, cores, flakes, handaxes, cleavers and bifacial points, numbering about twenty. From the distribution pattern of the artefacts which are on pale yellowish and brownish quartzite spread in a more or less circular cluster, it appears to be an activity locus where tools were made and used for various purposes. Artefacts are found scattered all over in the cultivated fields around the Tanda.

Rayalagandi Tanda (RGT) (16° 25' 03" N; 78° 53' 17" E, 592 m AMSL) is 2.5 km south of Padra village and by and just on the right side of the Amrabad-Padra road. There is a metal road from Rayalagandi Tanda to Kondavanipalli Tanda. About 200 m on the left side of the road from Rayalagandi Tanda, fresh artefacts are found exposed on an eroded surface. It appears to be medium site.

Vankeswaram (VKM) (16° 25' 34" N; 78° 55' 08" E, 602 m AMSL) is located about 1 km from Vankeswaram on both sides of the Vankeswaram-Ippalapalli-Maddimadugu road, just beyond the agricultural fields. A small quarry 3 m in diameter revealed the following stratigraphy. A fresh *in situ* core and flake were found in the lateritic red soil which is about 0-5 m. Overlying the weathered granitic bedrock, one cleaver, two handaxes and one discoidal core and some flakes were found at a depth of 10 m x 10 m deposit. The tools are all made on brownish and yellowish coarse to fine quartzite.

Across the hills in the valley about 5 km in a thickly wooded forest there is a rock shelter on huge granitic boulders. On the ceilings of the rock shelter are paintings of historic period done in white colour. The floor of the shelter at the entrance measures 7 m and near the narrow portion of the cave-like interior it is 1 m to 1-5 m and 2 m in height.

The vegetation around these sites is of scrub and thorny thicket type in the hills across within a radius of 10 km to 15 km. Vegetation is thick and dense which include a variety of species of food plants yielding fruits, flowers, leaves, nuts, seeds, tubers and roots. As the sites are at an elevated place surrounded by all critical resources of subsistence this is an ideal site for early hunter-gatherers.

4. EXCAVATIONS AT GOPALAPATNAM, DISTRICT VISHAKHAPATNAM.— Excavations at Gopalapatnam near Tuni conducted by the Department of Archaeology and Museums, Government of Andhra Pradesh, brought to light remains of votive stupas, viharas, cisterns and early historic habitation, datable to early centuries of the Christian era. A group of Buddhist settlements was also identified over a hillock locally known as Bhubikonda. Excavations at the early historic habitation in the village showed existence of brick structures and early historic cultural milieu datable from first century AD to fourth-fifth century AD (pls. I-II). Interesting is a broken figurine of nude squatting mother goddess in red sandstone.

5. EXCAVATIONS AT PAVURALLAKONDA, DISTRICT VISHAKHAPATNAM.— It is situated on a hill top in Bhimili town where excavations by the Department of Archaeology and Museums, Government of Andhra Pradesh, resulted in the discovery of a vihara consisting of five cells *having puma kalasa* motifs on either side of each entrance cell of the viharas. Trial digs near the tank just by the side of dilapidated Dutch building brought to light small votive stupas of different sizes over a big brick-paved platform. The early historic pottery consisted of fine black-and-red ware, red-slipped ware, black ware and decorated potsherds. Interestingly, two Brahmi label inscriptions near the tank reading *Kumarika* and *Kuvana Siri Gana Usha Sa Maha Tataka Chhata Maha Padanam* help in dating the site tentatively to the second century BC.

6. EXCAVATIONS AT THOTLAKONDA, DISTRICT VISHAKHAPATNAM.— Excavations conducted by the Department of Archaeology and Museums, Government of Andhra Pradesh, at Thotlakonda on Vishakhapatnam-Bhimili beach road revealed Vihara (II) and other structural remains belonging to the first phase. Baulks were removed to study in detail the structures and their relationship with other

religious structures located in the complex. Besides, the pathways connecting the structures and the entrance ways leading to congregation hall were also exposed.

BIHAR

7. EXPLORATION IN DISTRICT BHAGALPUR.— In course of exploration under village-to-village survey, K.P. Choudhary of Patna Circle of the Archaeological Survey of India[1] reported two sites as below :

Site/Village	*Tehsil*	*Nature of remains*
Chilkara	Baunsi	Old temple with black stone images of Siva, Parvati and Hanuman
Panda Tola	-do-	A stone temple of Vishnu, locally known as 'Madhusudanji ka Mandir' of fourteenth century AD.

8. EXCAVATION AT TARADIH, BODHGAYA, DISTRICT GAYA.— The Directorate of Archaeology, Government of Bihar, under Ajit Kumar Prasad assisted by A.K. Verma, Kumar Anand, S.K. Yadav, N.C. Ghosh, R.B. Modhi, Ajai Kumar Verma, M.K. Das, Hashmi and J.P. Yadav, resumed excavation at Taradih mound under the general supervision of Prakash Charan Prasad. The main objective of this year's excavation was to ascertain the extent of the monastic complex of the Gupta and Pala periods, and to determine different structural phases at the site. Work was resumed in four partly excavated trenches with a view to tracing the extension of already exposed structures. Besides, excavations were also taken up in two new trenches of 10 x 10 m.

In the course of excavations, two structural phases were encountered. The structures of the post-Gupta period were built of re-used bricks. Baulks were also removed to have a clear glimpse of the structures of Gupta and Pala periods. The nature of the structures belonging to these periods suggests a monastic complex, having cells with a common verandah. In one of the trenches brick platform of Pala period have been encountered. Thirteen courses of bricks have been exposed.

There is no marked difference in pottery from the two periods which mainly represent black ware and red ware. The important types in red ware include vases, carinated *handis,* bowls with flat base, storage jars, spouted vessels, basins, miniature pots, handles, lids, earthen lamp, skin rubber, hopscotch, etc. The noteworthy types in black ware are bowls, basins, etc. The frequency of black ware is very less as compared to the red ware.

Amongst the important antiquities discovered from the site, mention may be made of terracotta wheels, balls, earlobes, gamesman, animal and human figurines, a terracotta panel, sealings, etc. Sealings mostly belong to Pala period, representing the Buddhist creed. Besides objects of bone, copper, iron, etc., beads of semiprecious stone of different shapes and sizes have also been recovered

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[1]Archaeological Survey of India is referred to in the following pages as the Survey only.

from the excavations. Sculptural pieces found in the excavation include votive stupas, panels showing thousand Buddhas, *harmikas, chhattravali* and pedestals of various size, image of Vishnu, etc.

9. EXPLORATIONS IN DISTRICT HAZARIBAGH.— In the course of exploration, Prakash Charan Prasad of the Department of Archaeology and Museums, Government of Bihar, Patna, assisted by Jamil Akhtar discovered prehistoric rock paintings, rock shelters and some important artefacts, besides evidence of iron smelting foundry and iron slags at Isko (hill) area. Locally known as Satti hill, it is situated some 45 km south-east of Hazaribagh in Barkagaon Block. Isko probably signifies the Vedic term *ayaska* which stands for metal technology.

Three caves called Maro and the one Kahwar were explored. The Maro Cave 1 situated more or less on the top of the hill is suitable for early settlement. Interestingly, it has normal vents for ventilation and natural light. There is evidence of prehistoric settlement supported by the existence of stone scraper of Middle Palaeolithic period near the fountain. Maro Cave - 2 is small and marked by the presence of Middle Palaeolithic scrapers. A little further down the hill is located Cave - 3, i.e., Kahwar, which contains illustrations of early rock paintings. Some of these paintings even date back to the Mesolithic, Neolithic and Chalcolithic periods, marked by superimposition. These paintings cover approximately an area of 30 m X 8 m.

The paintings indicate direct evidence of organised hunting in which a row of human figures is shown vertically led by a man at the top who is found carrying the hunted animal over his shoulder. Other figures illustrated in the paintings comprise running bison, jumping deer, tree, bird on tree, lotus, sun, ring of circles, hill, anthropomorphs, geometrical designs, nude human figure besides magical symbols and diagrams, etc. An engraved dancing female figure is also noteworthy. The human settlement is also demonstrated by a village plan in one of the scenes of cave paintings.

10. EXCAVATIONS AT KOLHUA, DISTRICT MUZAFFARPUR.— In continuation of previous year's work *{Indian Archaeology 1990-91 — A Review,*[2] pp. 3-4) Excavation Branch III, Patna, of the Survey resumed excavation work at Kolhua. Limited area was taken up in order to ascertain the details of last year's partly exposed tank in area 'A' and to examine further the details of shrine in area 'B'. In the process trenches XA1 Qd 1 and3,XB l,Qd 1 and2,XC l,Qd2and YC 1, Qd 4 in area A and XD 2, Qd 3 and 4 in area 'B' were opened.

During the course of excavation, the northern wing (running east-west) of a brick lined tank was exposed (20 m), south of Asokan Pillar (pl. III). The maximum length of this wing of the tank is yet to be ascertained of which the exposed portion running westward exposed measured only 60 m. The northern wing of the brick lined tank exposed so far in trench XA 1, Qd 1 and 2 and XB 1, Qd 1 and 2 fashioned in tier system with a varying measurement of projections and height of the tiers measuring 0.40 m to 0.50 m and 0.60 m to 0.70 m respectively. It was exposed to its maximum depth of 3.50 m, having six tiers. The western part of the tank in XC 1, Qd 2 and YC 1, Qd 4 was built in receding offset fashion (pl. IV) approximately 0.10 m. The tank beyond a depth of 3 m was again fashioned in tiers of

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[2] This publication is referred to in the following pages by the year only.

which only two tiers were exposed. The variation in the tier was noticed in the form of laying out bricks on edge in one full brick length. The culmination of both the styles could be noticed in trench XB 1, Qd2.

The time span of structural activites in-between the tank and stupa area ranges from Sunga-Kushana to the late Gupta period.

In area 'B' the trench XD 2, Qd 3 and 4 were opened to trace the opening of the main shrine which has been superimposed by the second phase of the boundary wall with extended length and reduced width. The boundary wall had been provided to give an open courtyard to the massive shrine in its initial two phases of construction. The boundary wall in the second phase has been extended to further north with a slight reduction of width from both the ends in the extended part of the boundary wall. In the process, the *ardhachandrakara* opening provided to the first phase of boundary wall has been overlapped by the second phase of extended boundary wall. The magnificent gigantic shrine noticed earlier has also got two phases of its construction. The opening to the second phase of boundary wall could not be noticed as the wall has survived upto the foundation level only. In its third phase, the complete courtyard within the boundary wall and the massive shrine were turned into residential apartments reusing the existing structures as foundation (pl.V).

Besides terracotta ball, head, etc., a few human figurines have also been reported from the tank area. Northern Black Polished Ware (NBP) and its associated ware with grey and black ware have been recovered from the earlier level of the site, while from the mid level were found sprinklers and spouts in fairly good number. The late level of the site yielded red ware with coarse to medium fabric treated with a thick red slip as noticed earlier.

11. EXCAVATIONS AT DAK BUNGALOW AREA, DISTRICT PATNA.— The Excavation Branch III, Patna of the Survey, conducted a trial dig at the Dak Bungalow site, Frazer Road, Patna. Two trenches, *viz.,* DKB 1 (5 m X 5 m) and DKB 2 (8 m X 5 m) with the north-south and east-west orientation have been undertaken for digging to ascertain the antiquarian remains and historicity of the area. The site DKB 1 was excavated upto the depth of 1 .75 m after which the work was discontinued due to seepage of water. The total output as revealed, consists of dumps of two levels formed by thrown up earth of the recent period. Some terracotta balls and dump potteries have been found.

The trench DKB 2 was excavated upto a depth of 3.40 m. Altogether seven layers were exposed. The antiquities comprise terracotta balls, beads, animal figurines, etc. Besides, three ring wells have also been noticed in this area.

The pottery from the Dak Bungalow site comprise NBP and its associated red ware, black-slipped ware, grey ware. The entire range of pottery is wheel-turned. The types represent basin, bowl, lamp, storage-jar, vases, lipped-bowl and miniature pots. On the basis of pottery and findings the site is dated to the Mauryan period.

12. EXCAVATION AT MANER, DISTRICT PATNA.— In continuation of previous year's work *(1989-90,* p. 10), the Department of Ancient Indian History and Archaeology, Patna University, under the joint direction of B. Narayan and A.K. Singh and over-all supervision of B.P. Roy, assisted by J.P. Singh, N.K. Arya and P.K. Bose, resumed excavation at Maner.

The main objective of this year's excavation was to ascertain the cultural sequence of the central area of the mound. In view of the above, two trenches, each measuring 6x4 m, were laid out towards the eastern side about 3-5 furlongs from the western edge of the mound overlooking the old bed of the river Son. The trenches laid out in east-west orientation were christened as MNR-3A and 3B.

Excavations in this area revealed three cultural periods as against the four reported earlier.

Period I, belonging to the NBP phase, is represented by a deposit of compact yellowish brown soil (layer-4) with an average thickness of 1 -40 m overlying the natural soil. The pottery obtained from this layer include NBP in varying shades and its associated black-slipped, black-and-red, grey and red wares. The notable antiquities comprise terracotta ramcart, female head, male figurine, potter's mould, skin rubber and stone and terracotta beads (pl. VI A).

Period II is distinguished by the appearance of Gupta antiquities and some structural remains such as terracotta ring-well and a portion of a floor plastered with *surkhi* and lime. The whole cultural deposit of this period is divisible into two layers ranging from layers (3) to (2) and the total thickness of the deposit is around 1.88 m. The layer (3) having a thickness of 1.20 m is characterised by less compact blackish soil, while layer (2) is composed of compact blackish soil and its thickness is about 68 cm. The floor ascribed to this period has a thickness of 18 cm and it rests over a sub-layer having a thickness of 30 cm. Both the remains of floor and ring-well with eighteen courses of rings are sealed by layer (2). The pottery from the above layers are mainly red wares including some polished specimens and a sprinkler. Among antiquites, circular terracotta plaque (pl. VIB) showing *gaja*-Lakshmi figurine, ear-lobe, reel, potter's dabber, squarish cake with linear design, sling ball, gamesmen, beads, etc., made of terracotta, seal-like object of copper, copper-wire, iron objects and stone beads are noteworthy.

Period III is marked by the occurrence of Pala antiquities and structural remains of early medieval period. The period in question is represented by a cultural deposit (2-77 m), divisible into four sub-layers. The whole deposit is characterised by compact, less compact, a little compact soil, while loose greyish soil seem to represent a somewhat disturbed deposit. But curiously enough its lower levels (Id to lc)are marked by the occurrence of Pala antiquities along with stray occurrence of green glazed sherds of early medieval period, while its upper levels (lb to la) are characterised by greater frequency of green glazed sherds along with fewer Pala antiquities. Notable Pala antiquities include terracotta animal figurines, stamp-like object, beads and conical objects. The structural remains of early medieval period associated with upper levels comprise a brick-wall running from east to west and also associated with this wall is a brick-made *Sandas*-like structure sealed by layers (la).

13. EXCAVATION AT DULMI, DISTRICT WEST SINGHBHUM.— B.K. Sharan of the Patna Circle of the Survey carried out a small scale excavation at Dulmi, assisted by G.S. Narasimhan, B. Nath, Sunil Kumar, K.P. Choudhary, K.C. Srivastava, P.K. Tripathi, S.K. Arora and Rakesh Kumar. The site of Dulmi (23° 3' N; 86° 1' E) extends from north to south for nearly one mile along the left bank of river Subarnarekha and falls under the submerged area of Chandil dam, being constructed a few miles down the stream, across the same river. With a view to examining the antiquity of the site, trenches were laid at three points, *viz.,* DLM-I, II and III. From the remains found at DLM I and II, it appears to be a single culture site, belonging to the Medieval period, whereas DLM-III, atop the hillock exposed the plan of

a temple, dedicated to Siva. It consists of a *garbhagriha, antarala, mandapa* and *mukhamandapa*. The temple seems to be made of reused material of some earlier structure in the vicinity which is yet to be traced. The bricks used are of different sizes, *viz.,* 40 X 24 X 7 cm, 42 X 18 X 7 cm, 30 X 20 X 6 cm and 26 X 14 X 5 cm, etc. A Siva- *linga* of black stone and some other specimens of Hindu deities, architectural members, decorated/moulded bricks, etc., were recovered from the surface, besides a terracotta dabber from the excavation. Pottery comprised red ware and micaceous red ware, mostly devoid of wash or slip and are often ill-baked with medium to thick section and fabric mostly medium to coarse. Important shapes are dish, bowl, carinated *handi,* vases, etc. Stem portion of a pot-on-stand (probably incense burner ?) is worth mention.

14. EXCAVATION AT ICHAGARH, DISTRICT WEST SINGHBHUM.— Limited excavation of a temple site at Ichagarh was carried out by the Excavation Branch III, Patna, of the Survey under the supervision of L.C. Singh assisted by Vijay Shankar, P.C. Das, Y.D. Sharma, S.C. Mishra and Udai Shankar Singh to expose the remains of an ancient temple locally known as Chaturmukha Mahadeo temple. Excavations were done not only to expose the plan and elevation of the temple but also to document the sculptural and architectural members in order to transplant and shift the temple to a safer area.

The excavation revealed an old temple (pl. VII), rectangular on plan survived to a maximum of three courses of ashlar masonry. The temple is in east-west orientation with a projected opening towards east. The plan of the temple externally measures 13 m east-west X 7.00 m north-south. The projected opening towards east of the temple measures 1.85 m (east-west) X 2.50 m (north-south). Thus the main rectangular plan of the temple minus projected opening measures externally 11 .75 m (east-west) x 7.90m. The sanctum sanctorum of the temple measures externally 5.30 m (east-west) X 4.30 m (north-south) and placed at a distance of 1 .75 m from the western wall and 4.65 m from the eastern wall when measured internally. It maintains (when measured internally) a distance of 1.30 m from the left wing (north side) and 1.90 m from the right wing (south side) of the temple and thus it appears that the space on the right, left and the back sides of the sanctum sanctorum have been utilized as circumambulatory-path to the main shrine or the main deity placed in the sanctum sanctorum of the temple. The area in front of the sanctum sanctorum which is wider, measuring 4.65 m east-west (when measured internally) might have served as part of circumambulatory path and a *mandapa* in front. The entire area in-between the circumambulatory path and vestibule *or mandapa* in front have been paved with brickbats and the top rammed with lime, *kankar* and *surkhi.* The entire sanctum sanctorum was paved with flat stone slabs inside the shrine. Perhaps, the image of Chaturmukha Mahadeo placed nearby in a modern temple, was the original image, enshrined in the sanctum sanctorum which is found in damaged condition.

Out of the three courses of ashlar masonry survived in the foundation of the temple, the bottom most course is made out of undressed stone, while the two courses of ashlar masonry are dressed with moulded outer pan. The stone slabs of the topmost course (third) are carved and laid in such a fashion that their bottom was laid at a distance of 5 cm inwards above the second course of masonry and the side was moulded in recess giving impression of imitation flat and recess-moulded designs.

The richness of architectural members found scattered all over the site and some of the dislodged members collected during excavations indicate the gigantic size of the temple. The artistically carved architraves with floral motifs (pl. VIII A), swan picking the pearl's garlands (pl. VIII B), a lady carved

in relief bowed in adoration (pi. VIIIC), geometrical and niche design, *arnalakas* (pl. VIIID), *pranala,* inverted lotus, *kantha* of the *sikharas* were also noticed. Besides, a small stone slab representing a broken *purnaghata* with one line fragmentary inscription is noteworthy.

Evidence of two subsidiary shrines have also been noticed on the southern and south-eastern end of the temple site at a distance of 2.15 m and 115 m respectively. These have almost square plan, measure 2.10 m square and 1.80 m X 1.50 m respectively with two remaining courses. On palaeographic evidence the site could be dated to the late medieval period.

DELHI

15. EXCAVATIONS AT LAL-KOT AND ANANGTAL, DISTRICT SOUTH NEW DELHI.—The Delhi Circle of the Survey under the direction of B.R. Mani, assisted by Urmila Sant, A.K. Khanna, Vishnu Kant, A.C. Chakravarti, M.K. Batra, D.K. Bhardwaj, S.K. Dikshit, R.B. Chhatri, R.K. Sachdeva, G. Nageshwar Rao, Jagdish Chander, L.S. Mamani and V.P. Verma carried out excavations at the citadel mound of Lal-Kot (28°31' 40" N; 77° 11' E) and adjoining Anang Tal, a reservoir traditionally known to have been constructed by Anang Pal II, the Tomar ruler in the middle of the eleventh century AD. The excavations were taken up with the view to study the layout and settlement pattern of the palaces and other allied structures of the citadel and to confirm the literary evidences about the location and shifting of the royal seat in Delhi. Another objective was to confirm the structural conception of the huge depression on the eastern side of the mound, known as Anang Tal. The citadel area must have been at a distance from the temple-mosque complex, preferably at higher level of strategic importance with better water facility. Such suitable spot of the citadel in the fort of Lai Kot could be searched only at the massive main mound having large structural complex of rubble stones abutting the Anang Tal on its western side.

Lai Kot is the earliest known fort in Delhi which is supposed to have been constructed in the middle of the eleventh century AD by Anang Pal II, the Tomar ruler of Delhi. Its lofty walls, massive bastions and gateways are mostly damaged and sporadically covered with debris. The circumference of the ramparts is nearly 3-6 km with varying thickness ranging between 3 to 9m. The total area of the fort is 7,63,875'sqm. It is presumed that Anang Pal II peopled Delhi and constructed the Lal-Kot between AD 1052 and 1060. Amir Khusrau mentions the palace of Anang Pal and the Ain-i-Akbari and a few other works are specific about the residence of Qutb-uddin Aibak and Iltutmish in the fort of Rai Pithora which is none other than the Lai Kot. Kushak Firozi, Kushak Sabj and Chabutra Nasira were the palace sites of Mamluk Sultans of Delhi in Lai Kot and on the basis of Ibn Batuta it can be said that in the year AD 1205 Qutb-uddin Aibak built a palace in the fort which was known as Kasr-Safed or White Palace. Kasr-Safed, was also occupied later by Iltutmish, Nasiruddin Mahmud Shah, Balban and others. The earlier excavations conducted by Y.D. Sharma from 1957 to 1961 at Lai Kot were mainly confined to the fortification walls.

The main mound at the citadel site of Lai Kot was named as LKT-1 where excavation trenches in form of 10 x 10m squares divided by quadrants were laid and excavations were done in 40 quadrants of 16 squares (pls. IX-X). Maximum height of the mound (fig. 1) is about 10 m near peg Al of LKT-1 (254 m above sea level). The maximum length of the mound is about 300 m in north-south and 50m in east-west orientation. During the excavations it was noticed that debris of the adjoining damaged

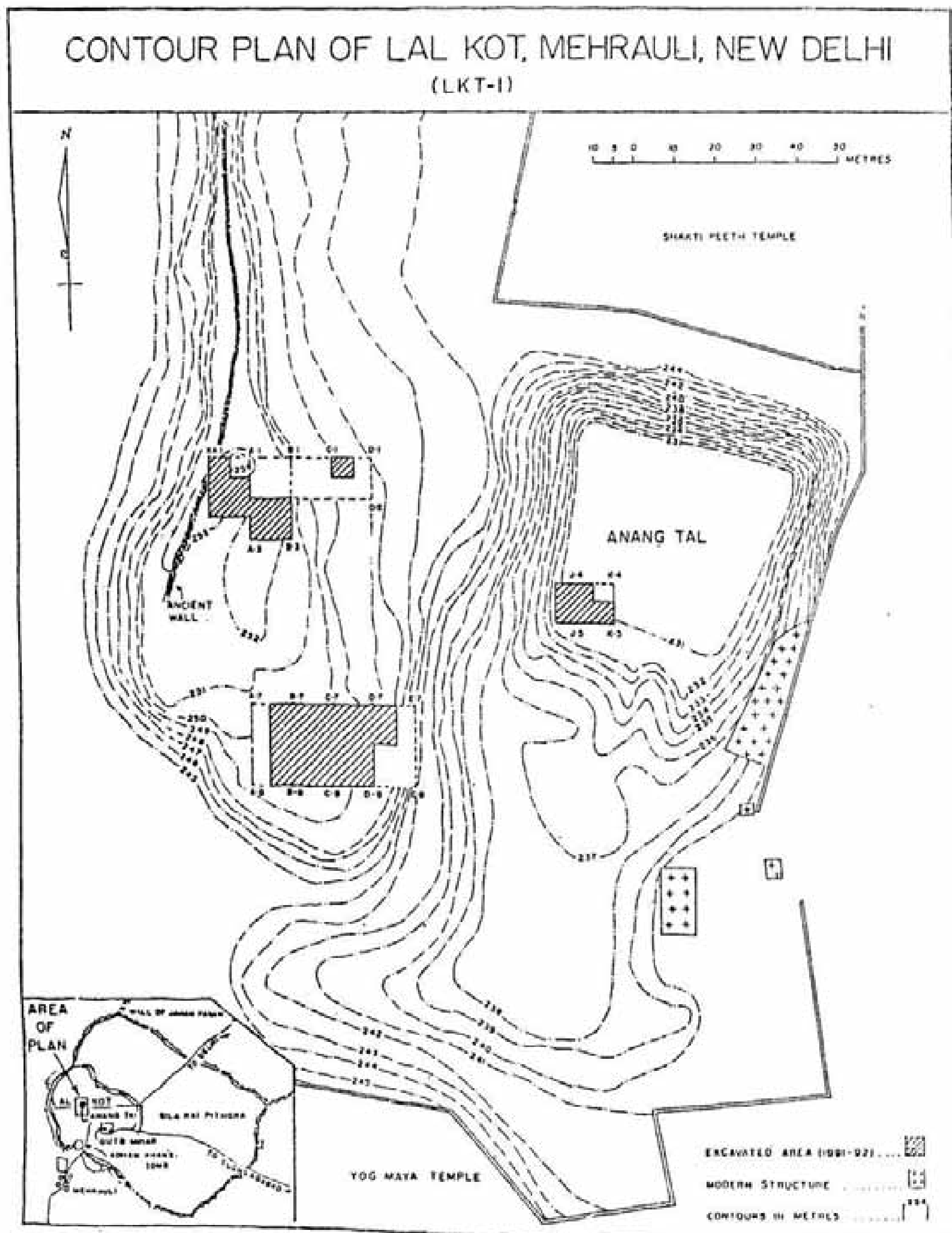

CONTOUR PLAN OF LAL KOT, MEHRAULI, NEW DELHI
(LKT-1)
N
METRES
SHAKTI PEETH TEMPLE
ANANG TAL
ANCIENT WALL
YOG MAYA TEMPLE
AREA OF PLAN
LAL KOT
QUTB MINAR
EXCAVATED AREA (1991-92)
MODERN STRUCTURE
CONTOURS IN METRES

Fig. 1

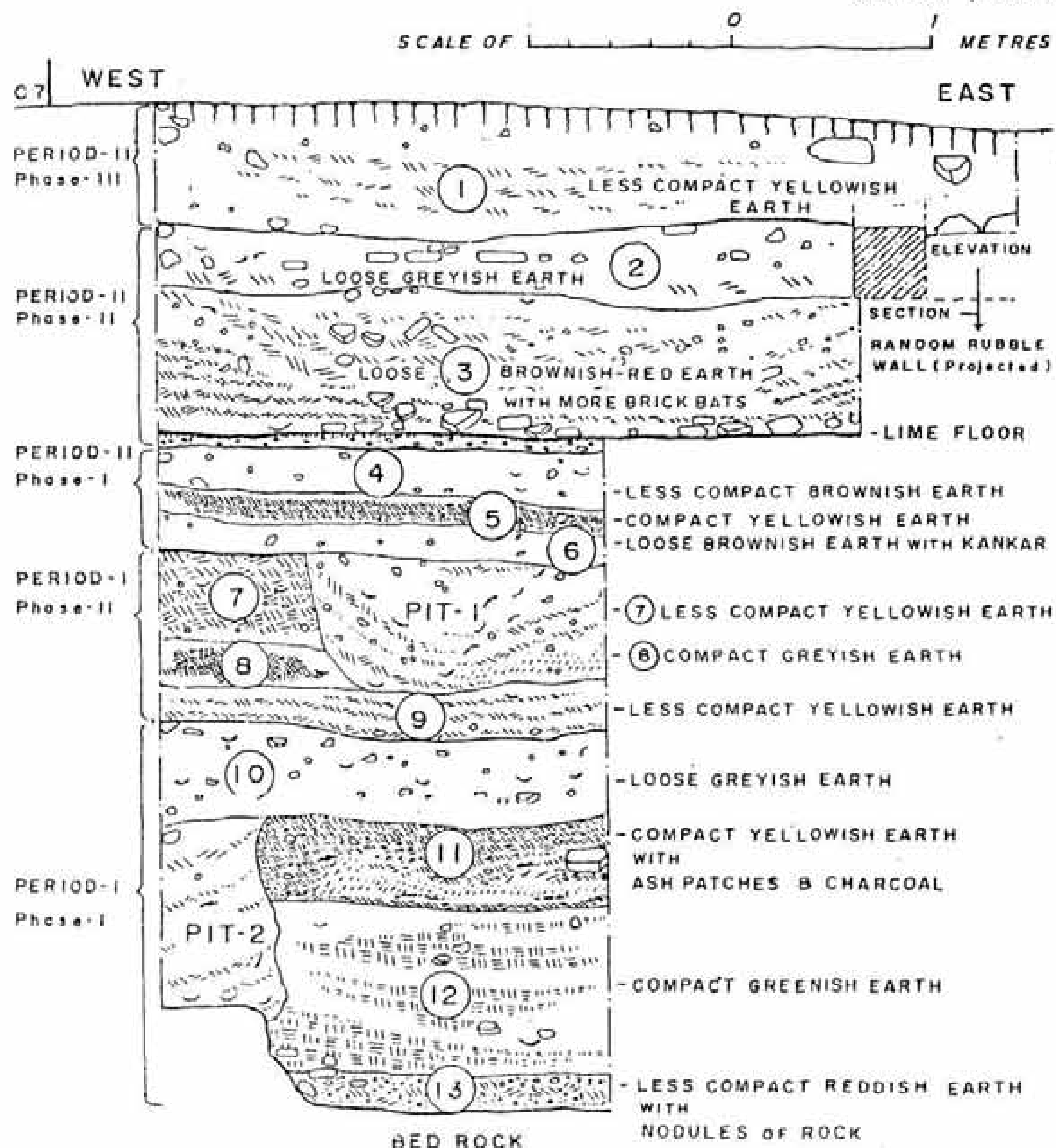

LALKOT 1991-92
LKT-1, SECTION FACING SOUTH
SQ. C 7, Qd.-I
SCALE OF 0 1 METRES
C7 WEST
EAST
PERIOD-II Phase-III
LESS COMPACT YELLOWISH EARTH
LOOSE GREYISH EARTH
ELEVATION
PERIOD-II Phase-II
SECTION
RANDOM RUBBLE WALL (Projected)
LOOSE BROWNISH-RED EARTH WITH MORE BRICK BATS
-LIME FLOOR
PERIOD-II Phase-I
-LESS COMPACT BROWNISH EARTH
-COMPACT YELLOWISH EARTH
-LOOSE BROWNISH EARTH WITH KANKAR
PERIOD-I Phase-II
PIT-1
-⑦LESS COMPACT YELLOWISH EARTH
-⑧COMPACT GREYISH EARTH
-LESS COMPACT YELLOWISH EARTH
-LOOSE GREYISH EARTH
-COMPACT YELLOWISH EARTH WITH ASH PATCHES & CHARCOAL
PERIOD-I Phase-I
PIT-2
-COMPACT GREENISH EARTH
-LESS COMPACT REDDISH EARTH WITH NODULES OF ROCK
BED ROCK

FIG. 2

structures have fallen from all the sides in the tank and hence it is not possible to take accurate measurements of the tank unless the structures are properly exposed. Roughly the dimensions of the inner area of the tank are about 50 X 50m in north-south and east-west orientation. The present depth of the tank is about 14 m from the adjoining ground level (the bottom level being 231 m above sea level). Because of the close proximity and the probable association of the Anang Tal with the mound, the area was covered under LKT-1 and accordingly trenches were laid out in grid fashion.

A preliminary study of the excavated remains revealed a sequence of two cultural periods:

Period I:- Rajput Period (middle of the eleventh century to the end of the twelfth century AD) Period

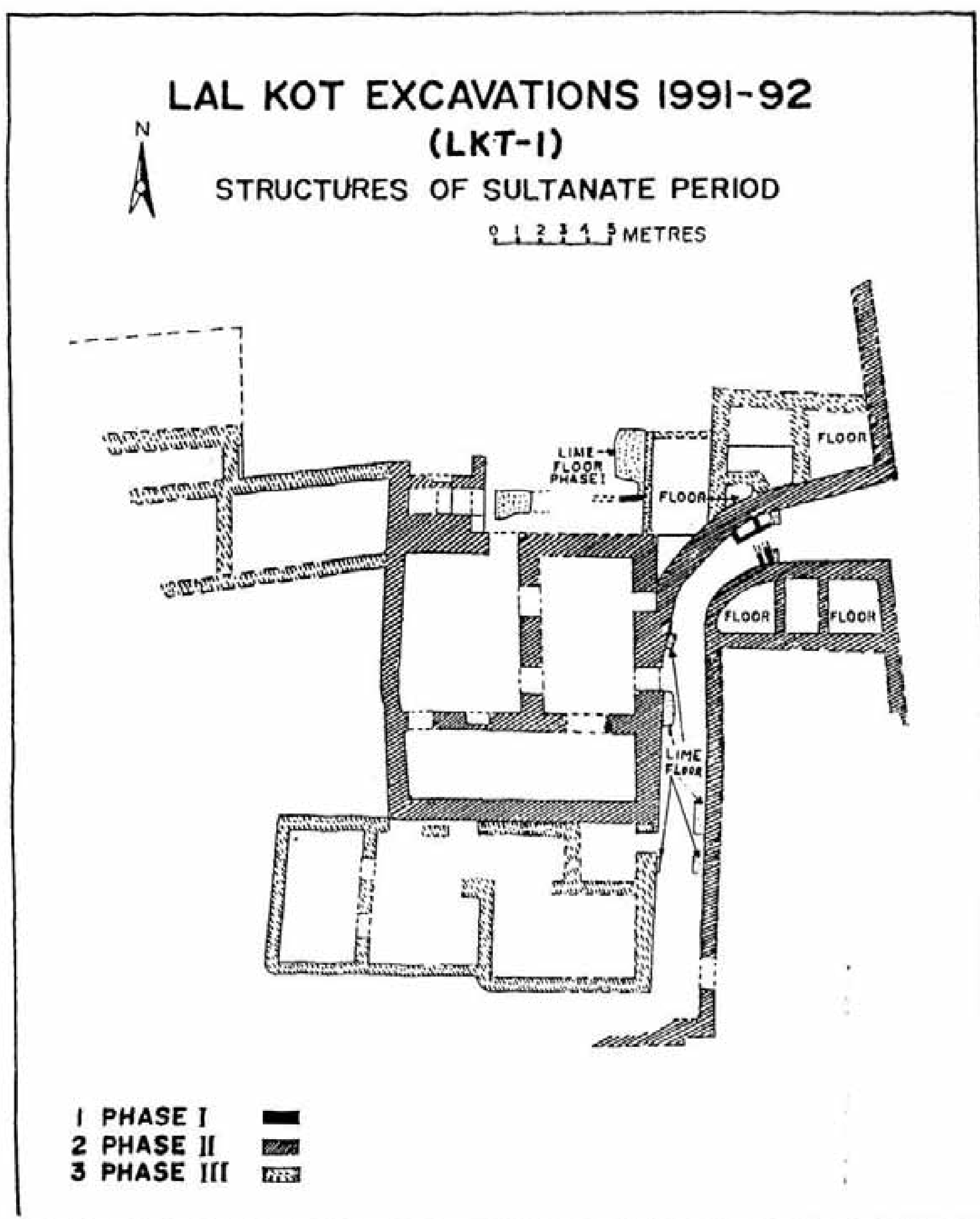
II:- Sultanate period (end of the twelfth century to the middle of the fourteenth century AD).

During this field-season, due to massive structural activities of the Sultanate period a limited area, restricted in one part of quadrant No. 1 of square C7 was excavated deep upto the natural rock wherein thirteen layers were encountered upto a depth of about 5 m (fig.2). Of the Rajput period, no structure could be encountered in the C7 under excavation. The study of pottery provisionally suggests two phases of the Rajput period. The phase I of Rajput period is represented by plain red ware also with red slip, decorated red ware with painted design in black colour, incised designs and occasionally stamped designs. Amongst the vases, some are decorated with incised horizontal bands, wavy lines and a line of notched triangles on the shoulder. Some pots are decorated with black painted zig-zag lines on the top or side of the rim of vases, small basins and lids and criss-cross pattern and horizontal bands on the shoulder of the vases. Mention may be made of a single potsherd from layer 12 with inscribed Brahmi letters of Gupta period (around AD 400) mentioning perhaps a name ' *V* (i) *ras* (o) *ma'* (pl. XIA). Only on the basis of a single sherd it is not possible at present to suggest a separate horizon of Gupta period.

The phase II of Rajput period is characterised by the occasional appearance of plain glazed ware of ordinary terracotta core, black-slipped grey ware with associated red ware. Small spouted vases occasionally double-mouthed, sharp-edged medium-sized bowls, cooking *handi* with ledged shoulder and mild carination, inverted flat terminal top lid, small to large-sized basins, miniature bowls and vases are the characteristic shapes of the Period I.

A conical hollow knobbed-lid and ring base were introduced in the second phase. The presence of glazed ware of ordinary core indicated that this phase was much closer to the Turkish invasion of Delhi as during the Muslim period its use was plentiful. Other finds of this period include a copper ring; two terracotta beads; a lipped earthen lamp; red ware circular discs or hop-scotches; and some fragments of legs of terracotta figurines.

The pre-Muslim association of this cultural period is evidenced by a number of scattered or reused architectural and sculptural fragments in the following period. Among them mention may be made of a stone *Varaha* figure, two stone *amalakas,* decorated pillar bases and a number of other decorated architectural fragments reused in later structures or scattered on the mound or in the tank area of Anang Tal alongwith a huge part of another *amalaka* and pillar bases found in the eastern part of the tank. The incised mason marks and the *Nagari* letters on dressed and semi-dressed stone blocks discovered during excavation in the south-western part of the Anang Tal are also evidences of Period I.



LAL KOT EXCAVATIONS 1991-92
(LKT-1)
STRUCTURES OF SULTANATE PERIOD
N
0 1 2 3 4 5 METRES
LIME-FLOOR PHASE I
FLOOR
FLOOR
FLOOR
FLOOR
FLOOR
LIME FLOOR
1 PHASE I
2 PHASE II
3 PHASE III

FIG. 3

The Sultanate period (Period II) is represented by four structural phases. Phase I is characterised by small lime plastered water tanks of brick masonry of which the western one has a small circular hole, provided in the southern wall at the bottom, a lime floor and a magnificent circular, eight lotus petal designed water cistern with brick masonry and lime plaster and 1.40m in diametre and 72m deep, ornamented with two series of circular drains around it. The top level of the cistern synthecised with the lime plaster floor with some sort of canopy improvised, as evidenced by the two stone pillar-bases of Rajput period set in the floor in one alignment and the two other pillar-bases may be traced after removal of the adjoining western baulk. In this phase the drains were probably open and water fell into the cistern through each petal of the lotus shape. The same drains were covered by stone chips and plastered over in the succeeding phase, i.e., phase II. The cistern was also used in phase II. The phase II is characterised by massive house complex of medium sized rubble masonry, lime floors, paved stone floor, lime plaster occasionally decorated. Noteworthy is the exposed part of the complex having two rooms of size 6-70 m x 4-80m and 9.60 m X 3 m attached with a verandah (pl. XII).of size 6-70 m x 3-90 m in the east and attached with 1.10 m wide staircase (pl. XIII) in the north to lead upwards. The opening of this complex is in the 2 m wide gallery on its eastern side with other openings of structures of the succeeding phase (fig.3). Notable feature of this phase was the occasional reuse of architectural and sculptural fragments of Rajput period. Amongst such remains the stone sculpture of *Varaha* (pl. XI B) of tenth-eleventh century AD and *amalaka* of some temple are remarkable.

The phase III is represented by a degenerated form of the earlier phase and is characterised by hearth, ovens, large-sized storage jars buried into the floors and a thick random rubble wall running north to south which fortified the mound (LKT-1) in the western side. The residents of this phase mostly reused the structures of the former phase. They occasionally added masonry walls in the former structures.

The phase IV is limited only in a small area at the top of the mound (LKT-1) and is characterised by the random rubble walls running west to east and turning towards north. On the basis of numismatic and other evidences, it seems that the first two phases of Period II represent the age of Mamluk and early Khalji Sultans (thirteenth century AD) when the royal seat was located in the Lai Kot. The latter two phases represent late Khalji and Tughlaq periods (first half of the fourteenth century AD) and the capital was shifted to Sin or Tughlaqabad and the site was perhaps occupied by common folk.

The significant feature of the Sultanate period was the use of plain and painted glazed ware, both of sandy-friable with whitish gritty core (pl. XI C) as well as ordinary terracotta core with associated red ware, black-slipped grey ware and thick grey ware. The underglaze decorations are patterns painted with brushes mostly in brown or black picked out with blue or greenish blue. Most of the sherds are painted with one colour- green, blue, greenish blue, pink or brown. The important shapes of the glazed ware are shallow dishes and bowls with ring base, decorated with floral and geometrical painted designs. A medium size vase with elongated body and of ordinary glazed red ware is remarkable. Chinese celadon is represented by a few sherds from the upper layers and its indigenous variety seems to have become very popular having sandy friable brownish white core and greenish surface. Two sherds of Painted Grey Ware (PGW) of protohistoric origin were also found in two different pits of layer-2 in Qd 1 of Cl and Qd 1 of C7 which suggest the location of such a protohistoric site in the

vicinity. Among other finds mention may be made of thirty-one copper coins of Horseman and Bull type and coins of Muhammad Ghori, Iltutmish, Razia Sultana (?), Kaikubad, Jalaluddin Khalji, Alauddin Khalji, Ghayasuddin Tughlaq and other Tughlaq coins without names. A large number of crude handmade terracotta human (pls. XID-XIV) and animal figurines (pl. XVA).The human figurines invariably represent bearded soldiers, categorised under Rajput period levels at Purana Qila, but found in large numbers from Sultanate period levels in the present excavations. Among animal figurines horse is the most common, fragments of inscribed Persian glazed tile with Arabic legends; beads of semiprecious stones, glass and terracotta; fragments of a large number of thin green-glass vessels and bottles probably with concave base; glass bangles; ivory ring; terracotta lipped lamps and *dipa-stambha* (pl.XV B); terracotta glazed tiles; ear-cleaner of copper, incense burner of copper or brass, decorated door nails of iron and other metallic objects and terracotta finials (pl.XV C).

Another notable feature of this period was the use of plenty of circular discs or gamesmen like hopscotches made out of glazed ware mostly with gritty core. The Chinese porcelain pottery is totally absent at the site which alongwith other evidences suggests that after the Tughlaq period the site was fully uninhabited. No specific evidence of a succeeding period was found in the excavations.

In the tank area of the adjoining Anang Tal the upper part was partly exposed in the southwestern corner. The exposed area suggests some types of steps and retaining wall with wide and long platform of the tank. This also suggests that the repairs or additions were done after the period of its original construction, most probably by Anang Pal II. The wide platform of thick lime concrete plaster was strengthened by semi-dressed stone blocks tightened with iron clamps. The remarkable feature of the Rajput period was the presence of incised mason marks on the semi-dressed stone blocks which were used in the construction of the tank. Amongst the mason marks the symbols *of swastika,* trident, circle divided into four parts, drum, numerals, letters, scorpion, bow and arrow are found which resemble such mason marks as found in the temple of Bhojpur (Madhya Pradesh) of the same period and also on the reused stone slabs in the Quwwatul Islam Mosque near Qutb. The name Pinasi is found in *Nagari* characters on one of the stone blocks. These evidences clearly suggest that the tank was originally constructed in the middle of the eleventh century AD, most probably by Anang Pal II whose name is conjured with it.

16. EXPLORATIONS IN NORTH AND WEST DELHI.— Delhi Circle of the Survey under the direction of B.R. Mani and Excavation Branch II under the direction of C.L. Suri assisted by Indu Dhar Dwivedi carried out explorations in Delhi and its neighbourhood. During the course of explorations three mounds near village Jhatikra (28° 31' 15" N; 76° 58' E) towards south of R jafgarh, two mounds at Bankner (28° 51' 10" N; 77° 4' 30" E) and a medieval fortress called Kot (28° 36" 20" N; 77° 0' 45" E) towards east of Najafgarh on the west bank of Najafgarh drain were discovered.

The 6 m high mound at Jhatikra-1 yielded PGW, grey ware, black-slipped ware, black and red ware, Kushana red ware and medieval ceramics including red ware, both plain as well as painted with black colour with criss-cross designs, glazed ware both with sandy friable core and terracotta core, white and chocolate painted grey ware and a piece of Chinese procelain. Other important finds from the mound include three copper coins of Sultanate period, stone bead, glass bangles, a stone ball and pieces of green glass bottles of medieval times. A Mughal period mosque is located on the eastern side

of the mound with *lakhauri* brick structures and lime plaster with a vaulted roof over it. The mound at Jhatikra 2, towards south and near village Badusarai, revealed remains of Delhi Sultanate and Mughal periods which include plain and black painted red ware, a sherd of Chinese porcelain, an iron sickle and pieces of glass bangles. Towards north of Jhatikra 1 at the mound of Jhatikra 3 near village Kanganheri remains of early historical period were noticed. A sherd of black-slipped ware was also found. The mound has been levelled. Plain as well as black painted red ware, a few iron objects and green and blue glass bangle pieces were found. Five decorated pieces of a brass object, a carnelian bead and a few stone querns were also found. A part of clay hearth was also noticed at the site.

At Bankner, about 4 km north of PGW site of Bhorgarh grey ware, red ware and pottery of early and late medieval periods were found. The two mounds have mostly been levelled. A terracotta lamp, a terracotta hopscotch and a polished stone piece with three deep cut marks were found.

Towards south-east of village Sakraoti Nagli on the west bank of Najafgarh drain a rectangular mud fortress was discovered which is locally called Kot. It has two corresponding gaps in its mud walls on northern and southern longer sides indicating locations of gateways. All along the walls in the inner side of the fort, red ware including a sherd with stamped design of sun, black painted red ware, grey ware, black-slipped grey ware, glazed ware with sandy-friable core and discs made out of them were found. A sherd of Chinese celadon, a terracotta ball and a glass bangle piece were also collected. The evidence of remains of brick wall abutting it in the southeastern side suggests the possibility of brick-strengthening of the fort wall at some stage.

GOA

17. EXPLORATION AT OLD GOA, DISTRICT NORTH GOA.— A pillar of black basalt with Portuguese inscription was discovered during exploration at Old Goa by K.K. Muhammed, S.K. Joshi and M. Nambirajan of Mini Circle, Goa of the Survey. This formed part of the tomb of Afonso Da Albuquerque, the conqueror of Goa and the real architect of the Portuguese empire in Southeast Asia. The newly discovered inscription reads:

IGREJA DA SERRA
ONDE FIO SEPULTADO
AFONSO DA ALBUQUERQUE

"The Church Da Sarra wherein lies the mortal remains of Afonso Da Albuquerque"

The tomb was housed inside the Church of Nossa Senhora da Serra which was built by Albuquerque in AD 1513, after his triumphant return from the Red Sea. Earlier the place of the church was occupied by the principal northern gate of the Adilshahi fort through which the Bijapur army had made their escape when Goa was captured by the Portuguese.

Besides, the remains of four pillars at Old Goa which were part of the famous St. Paul college built in AD 1541-43 were also located during exploration. The importance of this discovery lies in the fact that it enables one to reconstruct the main building of St. Paul. The blue and green glazed chips with which the walls were adorned were also collected from the site. It was here that the first printing machine brought to India was kept. It was also here that St. Xavier's incorrupt body, presently kept in Bom Jesus was kept when brought from China.

18. EXCAVATION OF ST. AUGUSTINE CHURCH, OLD GOA, DISTRICT NORTH GOA.— In continuation of previous year's *(1990-91,* pp. 4-5) excavation, the Mini Circle, Goa of the Survey continued excavation of the St. Augustine Church Complex (74°E 15°N), under the direction of K.K. Muhammed assisted by S.K. Joshi, G.K. Korgaonkar and Chandrakant Rama.

After removing thick scrubs and bushes scattered on the ruins of the said complex, two areas were selected for digging, one on the northern side in the outskirts of the main altar in search of the mortal remain s of the Queen Katherine of Georgia A and the other on the south eastern outlying part of the main church abutting the southern belfry in order to uncover the layout and other architectural members of the convent and its ancillaries B.

At the site A, north of the main altar six quadrants have been taken up. At a depth of 2 m, natural soil was noticed. Within the quadrants a huge quantity of human bones of about six-seven basket full and fragile skulls in a few numbers, were found. These bones were deliberately thrown in haphazard way thus creating an artificial burial for the commoners. A small burial (8 m X 7 m) could yield such a huge quantity of bone provokes many interpretations. It may be an action of secondary burial or a secret enclosure for the burial of the victims of the dreaded. It is possible that this secondary burial has played havoc with mortal remains of the queen and her bones are as eluding as it had always been.

At the outlying portion 'B', beyond the southern belfry as many as sixteen quadrants (4.25m X 4.25m each), were taken up for digging. The depth of the excavated trenches ranged between 3.4 m. Here, a huge entrance hall (8m X 8m) to the south of the belfry has been uncovered; the exposed laterite walls here are plastered as usual with lime mortar and further decorated with paintings in red ochre depicting beautiful floral and geometrical designs. From this hall, a wide door and a high window have been provided to the western wall giving access to the adjacent corridor of the convent which stretches on the west. The floor slabs, except a few, are missing to a great extent, keeping the whole area open and seemingly unattended.

Further, from the projected buttressed lane in the belfry a colossal doorway exactly situated in the north-east corner of the convental portion opens up an entry into the corridor of the complex of the convent. The remains of the 'L' shaped corridor of a convent with decorated massive pillars at regular intervals has been exposed. This row of pillars was once supporting heavily loaded roof atop, as is evident in the convent portion of the Basilica of Bom Jesus and the church of St. Francis of Assisi, etc. Beyond the passage of the corridor, bordering the outer line of the same, a bevelled edge of decorated basaltic stones makes a distinct mark between the working level of the passage and that of the rectangular open courtyard, probably meant for gardening. The passage of the corridor is paved with fairly dressed lateritic slabs now found as specimen, but missing heavily in most of the exposed areas. The northern and eastern interior walls in the 'L' shaped corridor are plastered with lime mortar and many coatings of lime wash can be witnessed in the chunks of plaster exposed in the walls of the precincts. The stucco crosses pierced by nails symbolic of crucification, all painted in red ochre arranged in a well defined frame, at regular intervals are noteworthy. These are traditionally known as the fourteen stations of the last journey of Christ with the load of cross.

The area under excavation has yielded a large number of glazed tiles. Blue and white Chinese pottery of the sixteenth and seventeenth centuries have been reported in profusion. They depict floral and geometrical designs and at times Chinese scripts also.

In the middle of the courtyard of the convent a water cistern (4.25m X 4.25m) is noticed, which is meant for storage of water to feed the then existing garden around. Built in laterite stone and lime mortar, it has a flight of steps in the north-west corner and a water fetching base slabs of basalt in the mid point of the southern edge.

During the course of the digging, a huge quantity of lateritic blocks of large dimension, some even containing architectural moulding has been met with, along with thin rectangular bricks and tiles of articulated section. They are the part of the roof and vertical walls once decorated with.

A trial excavation conducted on the backside of the Museum, along with the long wall running east-west, exposed the remains of an underground arched cell. Further clearance may uncover a series of cells of this sort.

Excavation near the new guest house uncovered the remains of massive east-west running wall with offsets. The trench yielded a large number of Chinese pottery and Islamic glazed pottery. Further excavation may throw revealing light about the history and nature of the structure.

Consolidation of the excavated structures was also taken up simultaneously. Floors, pillars, wall tops and corridors were strengthened with combination mortar in order to strengthen the exposed structures.

GUJARAT

19. EXPLORATION IN DISTRICT BANASKANTHA.— In the course of village-to-village survey, Vilas Jadhav of the Vadodara Circle of the Survey brought to light the following sites of archaeological interest:-

Taluk	*Site/Village*	*Nature of remains*
Kankrej	Anganwad	Sculptures of Parvati and Siva (twelfth century AD)
-do-	Akoli	Sculptures of Ganesa and Vishnu (twelfth century AD)
-do-	Boria	Medieval habitation mound
-do-	Bukoli	Temple remains, habitation mound, sculptures of Tirthankara and fragmentary inscription datable to twelfth-thirteenth century AD
	Chekhala	Sculpture of Parvati and brick temple of *circa* twelfth century AD

Taluk	*Site/Village*	*Nature of remains*
Kankrej	Dagwada	Medieval habitation mound
-do-	Kamboi	Sculptures of Vishnu, Chamunda and habitation mound of medieval period
-do--do-	Kapadivalla	Medieval habitation mound
-do-	Mudetha	Temple remains of Jaina pantheon belonging to fourteenth century AD
	Ranawada	Temple remains and sculptures of Ganesa, Siva, Parvati belonging to medieval period.

20. EXPLORATION IN DISTRICTS BANASKANTHA, MAHESANA AND SURENDRANAGAR.—V.S. Parekh, V.H. Sonawane and K.K. Bhan of the Department of Archaeology and Ancient History, M.S. University of Baroda, during the course of their exploration brought to lightfive Mesolithic sites, eleven Chalcolithic sites affiliated to the Harappa culture and two historic sites in the western part of north Gujarat, the details of which are given below:

District	*Taluk*	*Village*	*Site*	*Nature of remains*
Banaskantha	Radhanur	Pipli (23° 49' N; 71° 32' E)	Shakatri Timbo 255 X 120 m	Chalcolithic site affiliated to Harappa culture and historical period
-do-	-do-	Chaniyathar (23"31^{1}N;71^{O}44'E)	Thunda Timbo 120 X105 m	Late Harappan
-do-	-do-	Pad (23^{O}36'N;71'28'E	Godha 70 X 60m	Late Harappan
Mahesana	Sami	Anwarpura (23°35'N;71°32'E)	Rajasaro no Timbo 400 X 400 m	Mesolithic
-do-	-do-	Dadka (23°41'N; 71°36'E)	Godha 55 X 67.5m	Late Harappan
-do-	-do-	Godhana (23°43'N;7r37'E	Timbo I 30 X 31.5 m	Late Harappan

District	Taluk	Village	Site	Nature of remains
Mahesana	Sami	Godhana (23° 43'N; 71'37'E)	Timbo II 30 X 31.5 m	Late Harappan
-do-	-do-	Lakhneyani (23°39'N;71°34'E)	Thumda II 100 X 100 m	Mesolithic
-do-	-do-	Lakhneyani (23° 39' N; 71° 34' E)	Thumda I 30 X 24 m	Late Harappan
-do-	-do-	Nani Chandur (23° 36' N; 71° 28'E)	Nani Chandur 50 X 25 m	Mesolithic and Harappan
-do-	-do-	Nayka (23° 39'N; 71′42'E)	Footariya 30 X 8.7 m	Chalcolithic site affiliated to Harappa culture
-do-	-do-	Sengotheri (23° 41'N; 71° 26'E)	Sarkari Khet'ar	Early historic
-do-	-do-	Taranagar (23°35'N;71°35'E)	Pahera 35 x 35 m	Mesolithic
Surendranagar	Dasada	Jhadiana (23°24'N;71°44'E)	Zanzaria no Timbo 200 X 200 m	Mesolithic
-do-	-do-	Visnagar (23°28'N;71°34'E)	Laketra no Timbo 54 X 61.5 m	Late Harappan
-do-	-do-	Visnagar (23°28'N;71°34'E)	Linedoriwalo Khetar 67 X 54 m	Late Harappan

21. EXCAVATION AT PADRI, DISTRICT BHAVNAGAR.— Vasant Shinde with the assistance of Y.S. Rasar, Sonya Bhagat, M. Koiso, Rukshana Nanji and Elizabeth Thomas of the Department of Archaeology, Deccan College Postgraduate Research Institute, Pune, resumed excavation at Padri with a view to ascertain the possible function of the site as well as the social aspects of the Harappans. The area north of trench 12, excavated last year *(1990-91,* pp. 8-10), was selected and six trenches were dug. A number of structures were exposed in both, the Harappan and the early historic levels.

The excavation in the Harappan level (Period I) was confined to the uppermost level, in which a number of rectangular interconnected mud-structures were exposed (pl. XVI). This level could be tentatively dated to the beginning of second millennium BC because of the similarity of the ceramic assemblage to that of phase B of Rojdi. The excavations yielded a large, roughly squarish structure (4) measuring 5.3 m (north-south) X 5.76 m (east-west), the southwestern part of which has been destroyed by the villagers while obtaining soil for constructing walls of their houses. The structure contains a roughly circular fire-place in its northwestern corner and a well-made floor of alternate layers of gravel and silt, which was plastered with cow dung. The western wall of this structure extends further towards north and forms the western wall of structure 5, which is located adjacent to the north of the former. It is rectangular in plan with its eastern part slightly flaring and ending into an open space. The average length of this structure is 6-90 m (east-west) and the width is 3.55 m (north-south). It is closed from three sides, whereas the eastern side is open. In the central part of this structure, there was an irregular fireplace along the northern wall. This could be identified as the courtyard of structure 4. Structure 6, located close to 5 to its north, is rectangular in plan. It is divided into two by a thick partition wall, forming two small roughly rectangular rooms. The western room of this structure, measuring 3.75 m (east-west), 2.28 m (north-south), contained a large, roughly circular fire-place. This could perhaps serve as the kitchen of this structure, whereas the eastern room (structure 6a) could be used for storage as it yielded a couple of large broken jars of coarser variety. The eastern part of this room was found destroyed by the floor of structure 3. It survived to a length of 2.13 m. Structures 4 and 5 perhaps formed a complex, whereas structure 6 appears to be an independent household. All these structures had thick walls, the average thickness being 65 cm.

An ethnographic study of the present-day salt manufacturing community carried out by this team revealed that small rectangular pits made to arrest brackish water from the sea for further evaporation into crystals *(kera).* Padri known as *kerala-ne-dhoro,* was possibly occupied by the salt manufacturers. The Harappan level yielded a terracotta button-shaped seal inscribed with a fish pattern, made on a broken stud handle.

Period II (early Historic) yielded a roughly oval stone structure (7), with a maximum length of 5-30m. This was partially exposed in trenches Nl and N2. Three courses of stone structures were exposed. The floor of the structure is well-made by ramming hard the alternate layers of gravel and silt. In front of this stone structure to its south, was exposed a roughly oval floor (structure 3) with a number of post-holes along its eastern periphery. The nature of floor was identical to that found in the stone structure. The floor, which was exposed to a length of 6-30m, was found to be continuing in the southern and northern sections. Its maximum width was 3.5 m. Two circular platforms with a diameter of 1.5 m each were noticed on either ends of the floor. Two terracotta plaques of *Lajja-gauri* were recovered

from the adjoining area of this floor, of which one is complete and the other broken. The former is almost rectangular in shape measuring 8 X 6.5 X 1.8 cm. On the left hand side of the sculpture there is a figure of seated Nandi. The structure and floor assumed significance in the light of the discovery of these figurines and two circular mud-platforms, much disturbed which possibly had some religious association.

22. EXCAVATION AT PITHAD, DISTRICT JAMNAGAR.— V.S. Parekh and V.H. Sonawane assisted by K.K. Bhan and P. Ajithprasad of the Department of Archaeology and Ancient History, M.S. University of Baroda, carried out an excavation at Pithad in Jodiya taluk, district Jamnagar. The site, locally called Jaidak Timbo, situated 4 km south of Pithad village (22° 41' N; 70° 35'E) on the eastern bank of the Aji river at present, has two mounds. Jaidak-1, is the larger one measuring about 300 X 150 m with a height of about 5 m from the surrounding plain. The second mound, Jaidak-2, probably an extension of the first mound, but now separated by a deep erosional *nullah,* is at about 50 m south-east, and measures 140 X 90 m. Excavation was carried out on the Jaidak-2 mound at its northwestern corner where structural features were clear on the surface itself.

The excavations revealed at 1.40 m habitational deposit having five different layers belonging to two distinctive periods. Of these, Period I belonged to the Mesolithic culture and Period II to the late Harappa culture. The Mesolithic culture at the site, is represented by layers 3,4 and 5, having 80 to 90 cm deposit, which directly lies over an alluvial deposit of loose gravel and sand. The Mesolithic deposit yielded a large number of microlithic implements and other artefacts like pieces of flat sandstone "palette" and hammer stones. The industry includes both geometric and non-geometric tool-types along with simple blades and flakes and other lithic waste. The collection, however, is predominated by non-geometric tool types like a veriety of points, backed blades, borers, retouched blades and flakes, and a large number of fluted blade-cores and a few flake-cores (fig. 4). A temporary break in the occupation at the site during this period is indicated by about 10 cm thick sterile deposit in the middle of the strata. A probable Mesolithic working floor has been traced at this level, on the basis of the regular arrangements of large, flat stone slabs and clustering of artefacts around these slabs. No substantial quantity of faunal remains is found from this deposit. A noteworthy find from the excavation, however, consists of a few pieces of ostrich egg-shell. It is for the first time that ostrich egg-shell pieces are found from a stratified Mesolithic context in Gujarat.

The late Harappan occupation, Period II, with a thickness of 50 to 60 cm, which is lying directly over the Mesolithic deposit, shows two phases of structural activity. The first phase of structures at the site is represented by a long rubble stone wall, with remains of a few more small walls in the second layer. However, the full extent of these walls could not be traced in the excavation. Associated with this structure was found a large pot, buried underneath the floor level. Structures of the second phase were, however, built after levelling the *debris* of the earlier structures. The excavation laid bare a large rubble-built structure consisting of a rectangular 6.2 X 5.5 m hall with two smaller rectangular compartments attached to its main wall on its western side. The main wall of this structure has a width of 75 cm and its extant height is 40 cm.

Fine red ware, buff ware, buff and cream-slipped wares, coarse red ware and coarse grey ware are the important pottery types recovered from this deposit. The pottery bears similarity with Rojdi-B and

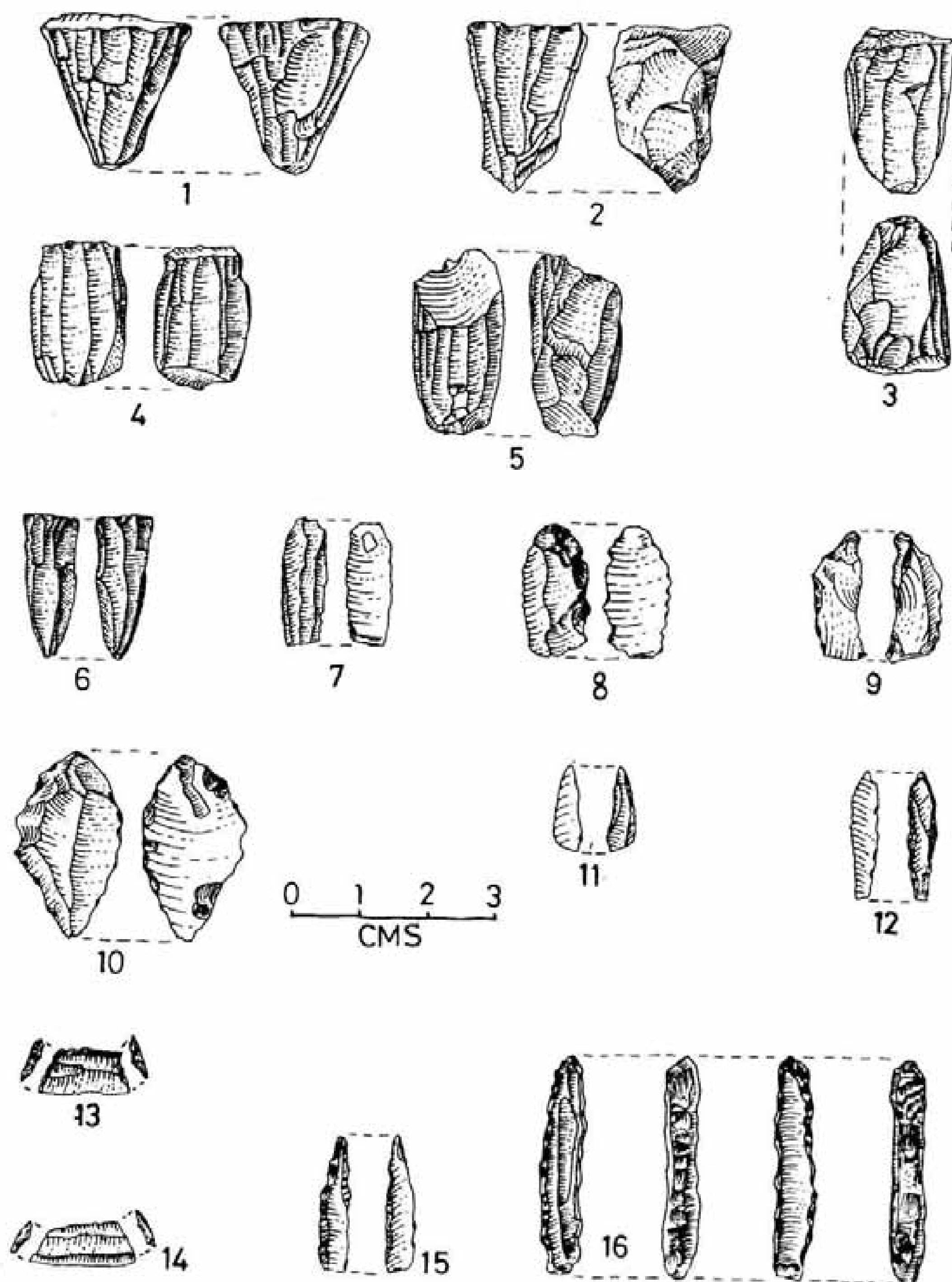


FIG. 4. *Pithad : Microliths*

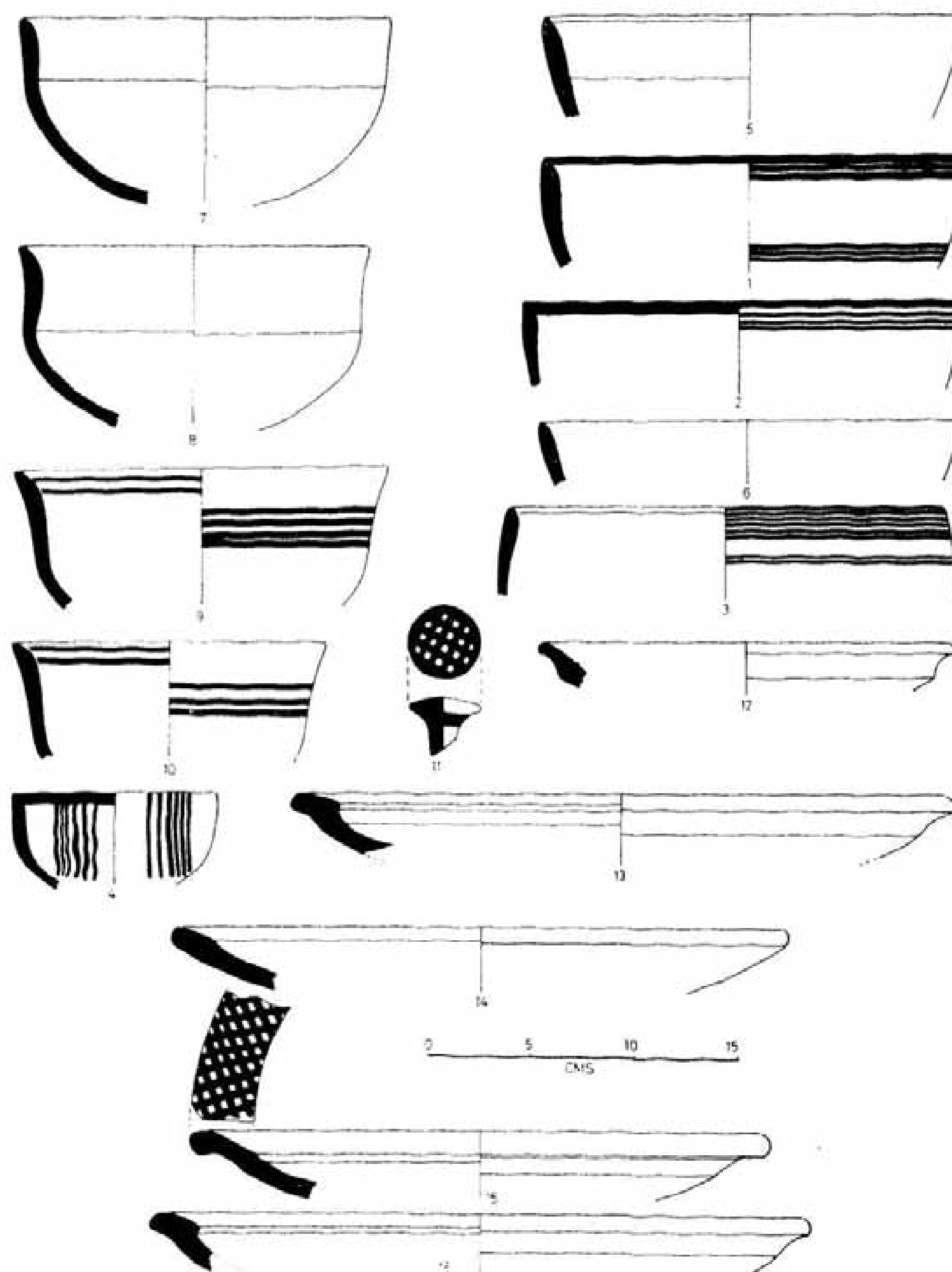


FIG. 5. *Pithad : Pottery types*

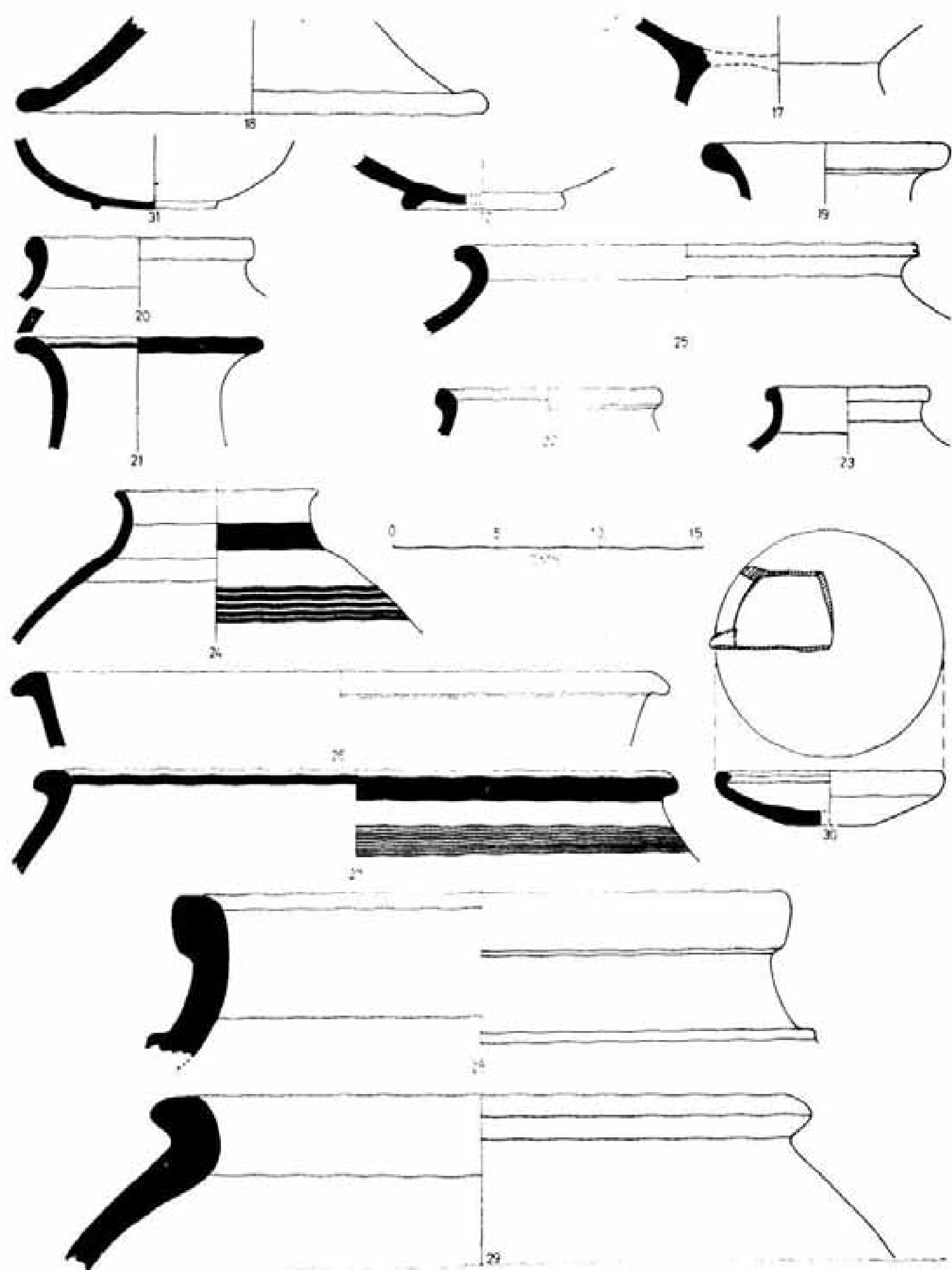


FIG. 6. *Pithad : Pottery types*

Rangpur-II B and C. Bowls, pots and jars with various types of rim and body features, dishes and dish-on-stand are the important shapes in pottery (figs. 5-6). A few vessels, especially the bowls were decorated with simple painted lines and strokes in black pigment. However, large coarse red ware pots were generally decorated with simple dots and wavy lines incised on them. Besides, a few small pottery lamps and a sherd of stud-handled bowl are also met with in the collection. The Black-and-red ware, common in Harappan sites of Saurashtra, has not been reported from the site. A large number of small terracotta biconical beads and a few beads of chert, agate and carnelian, microlithic blade tools and bits and pieces of copper/bronze objects are the other important antiquities recovered from the excavation.

Faunal remains from this period include fragments of bone, horn-core, antler and teeth of exploited animals. Besides, the faunal collection incorporated a large number of bivalve shells, which are found heaped in discrete clusters at different parts of the structure. This definitely indicates a wider and intense exploitation of aquatic resources by the late Harappan occupants of the site. The floral samples collected by floatation, and the faunal and other remains are now being studied in detail.

23. EXCAVATIONS AT DHOLAVIRA, DISTRICT KUTCH.— In continuation of previous year's excavation *(1990-91,* pp. 10-12), the Excavation Branch V, Vadodara and the Institute of Archaeology, of the Survey carried out further excavations at Dholavira under the direction of R.S. Bisht, assisted by R.P. Sharma, A.K. Patel, B.S. Negi, D.N. Dimri, Y.S. Rawat, Manual Joseph, Puran Singh, Balbir Singh, Ravinder Kumar, H.C. Thapliyal, R.K. Dalai, V.H. Parmar, N.B. Soni, J.B. Makwana and M.S. Rawat. Besides imparting field training to the students of the Institute and others, the proposed excavation aimed at reconfirming sequence at the Castle and obtaining stratigraphical sequence of the Middle Town, the Lower Town and the Bailey of the Citadel in addition to shallow digging in the E-W trench running across the Middle Town and the Lower Town.

The excavation was carried out in almost all principal areas of the Harappan city. While the digging at the Middle Town was completed in its eastward extension across the Lower Town, it was accomplished in the four-fifths of the trench in the Lower Town. Substantial work has been done in the east gate as well as north gate area of the castle. The excavation was carried down to the natural soil at three places in the castle, at two places in the Middle Town and at one in the Lower Town, which yielded 13.60 m, 8.65 m and 6.30 m of stratified deposit respectively, whereas regular occupational debris at the first-mentioned one amounted to 11.30 m to 11.40 m out of which 2.2 m pertained to two phases of raising of the ground. As obvious, each of the major divisions of the city had its own tale of origins and end. However, the best stratified account documenting the rise and fall of the Harappan culture as found at the castle, divisible into seven stages through which the Harappan city of Dholavira passed (fig. 7; pl. XVII).

The excavation further confirmed that the earliest settlement Stage-I at Dholavira was a formidable fortress probably with four walls, of which the southern one stands firmly with a basal width of 11.10 m and extant height of about 4 m although it should have been higher originally. It was made of rubble-stones set in mud mortar. The use of mud-bricks (36 X18 X 9 cm) in the construction of the defensive wall, albeit very sparingly, was attested to. A small portion of the western wall was found peeping out from the thickness of the subsequently widened fortification wall of the later stages. In the

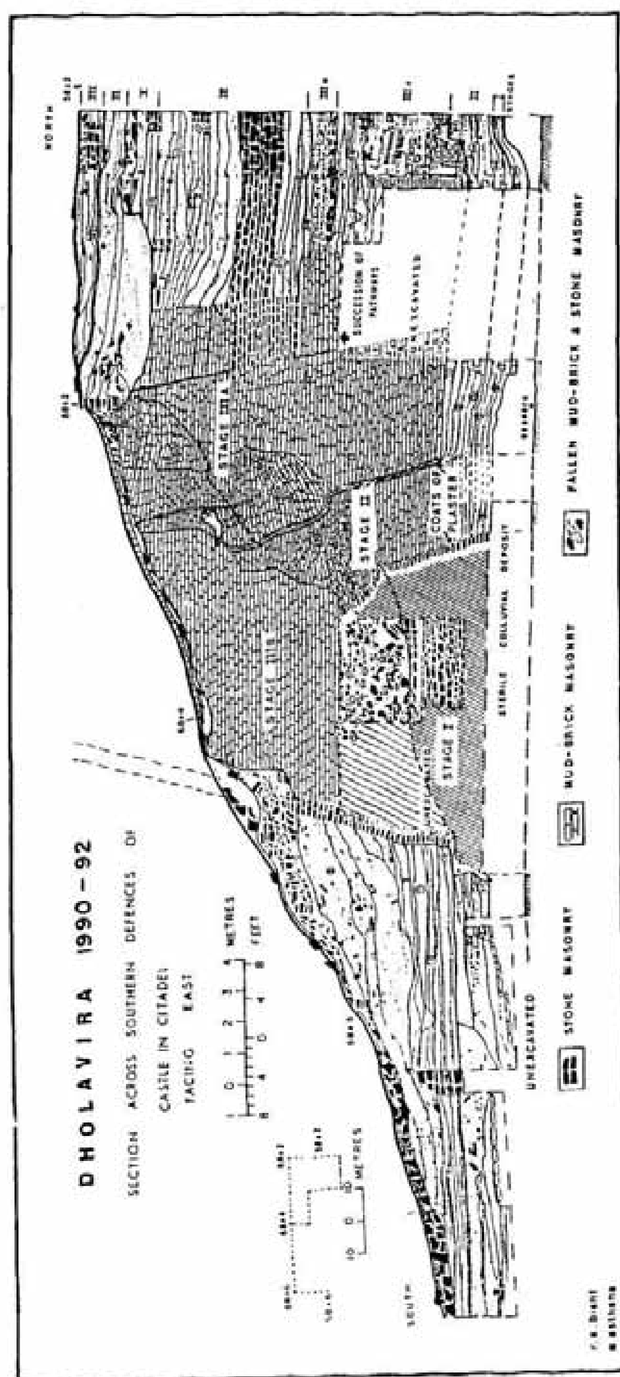

DHOLAVIRA 1990 – 92
SECTION ACROSS SOUTHERN DEFENCES OF CASTLE IN CITADEL FACING EAST
METRES
FEET
NORTH
SOUTH
STAGE III A
STAGE III B
STAGE II
STAGE I
COATS OF PLASTER
SUCCESSION OF PAVEMENTS
STERILE COLLUVIAL DEPOSIT
UNEXCAVATED
STONE MASONRY
MUD-BRICK MASONRY
FALLEN MUD-BRICK & STONE MASONRY

FIG. 7

construction of the house-walls, the mud-bricks appear to be the principal building material. The meagre evidence however suggests that the habitation was laid out on definitive principles of planning and architecture. The occupational deposit of Stage I (65-70 cm in thickness) revealed diverse pottery traditions, copper metallurgy, stone-dressing, lithic tool-technology, shell-working and use of long chert blades, micro-blades of chert and chalcedonic stones, beads of agate and steatite, bangles of shell and clay, standardised mud-bricks, triangular terracotta cakes and a large number of perforated jars and dishes-on-stand in pieces.

The beginning of Stage II was marked by the first addition of a 2-80 m thick mud-brick masonry wall raised against the inner face of the antecedent fortification wall. This stage is represented by a 70-90 cm thick debris of regular occupation during which the cultural milieu of the preceding stage not only continued but underwent a perceptible change both qualitatively and quantitatively particularly in case of pottery, antiquities and architecture. During this stage, the settlement expanded not only to the north alone but also to the east.

In Stage III existing defensive wall was further widened by adding a 4-5 m broad brick masonry from the inner side. This stage showed six building phases through a deposit of 3.30-3.60 m, divisible into two sub-Stages, i.e., HI A and III B.

The Stage III A, represented by four structural phases in a deposit of 2.20-2.50 m, is marked by a rapid growth of the settlement (pl. XVIII). The existing fortress was enlarged into two divisions, namely Castle and Bailey, the former on the relics of the earlier fortress while the latter added to it from the west, both being fortified. The northern extension of the preceding stage was cleared of its structures and transformed into a Stadium which was bounded by stepped terraces meant for the spectators. The Middle Town was founded to the north of the Stadium with a separate fortification, furnished with bastions, corner towers and gateways. A series of reservoirs along with inlet channels, dams, partition bunds and surrounding broadways had also been provided although provision of some of them (reservoirs) especially in the east, south and west of the antecedent settlements might have been in existence right from the beginning. The entire settlement consisted of the bipartite citadel, stadium, new-built residential division and the surrounding reservoirs, secured firmly by a circumvallation which, in turn, was reinforced with bastions and towers in additon to the two broad roads running all around the four walls of the town.

The Stage III B followed a catastrophic earthquake that caused extensive devastation at the site. Large-scale repair works were undertaken. The Lower Town was added to the east of that division of the town that was founded in the Stage III A and the city walls were also extended further eastward in order to encompass the new division.

The monumental gateways of the Castle and the appertenent terraces had come into existence in Stage III. Further, the most distinguishing trait of this stage, also of Stage II and, to some extent, of Stage I too, was the ubiquitous use of colourful clay of white and pink hues for making floorings as well as plasterings of both public and private structures. By Stage III, the town of Dholavira had attained the fully developed cityscape highlighted by the bipartite Citadel, Middle Town, Lower Town, Stadium, Annexe, dams, reservoirs, causeways and the city walls (fig. 8).

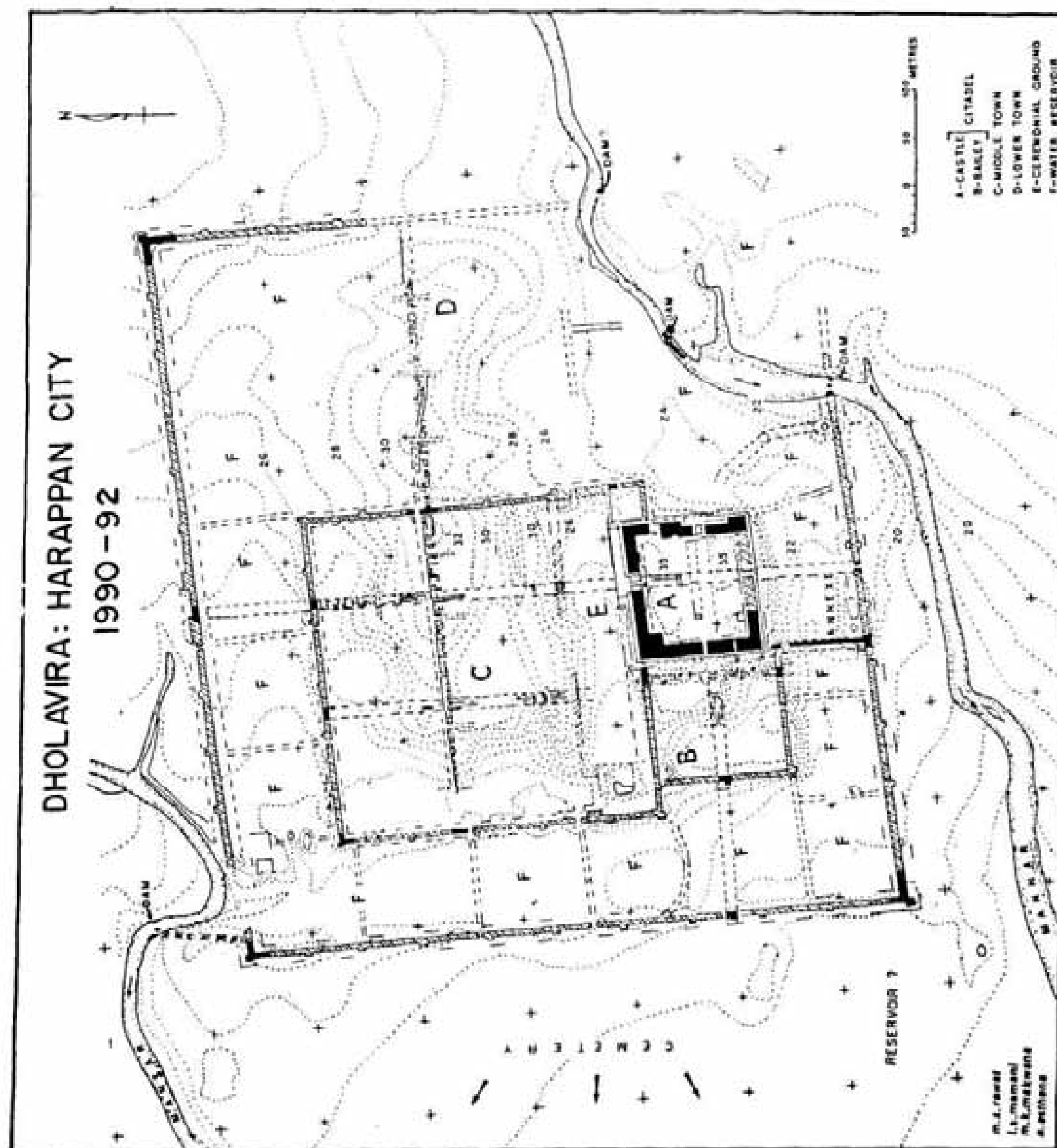

DHOLAVIRA: HARAPPAN CITY
1990-92
A
B
C
D
E
RESERVOIR ?
CEMETERY
DAM
ANNEXE
A-CASTLE
B-BAILEY
CITADEL
C-MIDDLE TOWN
D-LOWER TOWN
E-CEREMONIAL GROUND
F-WATER RESERVOIR

FIG. 8

Right from the beginning of Stage III, diagnostic Harappan elements such as stamp seals, the script, weights and many typical pottery forms as well as decorative motifs made their debut, albeit humbly yet emphatically. There are in all three seals of steatite which pertain to Stage III. All-of them conform to the Harappan standards of form, craftsmanship and art work, but are smaller and lighter comparatively. Most significantly, on all of them, the figurative motifs are present but inscriptions are missing. One of them depicts a developed mythological scene, *viz.,* a deity is shown wearing a horned head-gear and standing between two branches of a pipal tree, a devotee wearing an identical head-dress and holding an offering in his hands is kneeling before the former and an oversized ibex is shown standing behind the latter with his face to the deity. Obviously, the theme is a repetition of the scene on a Mohenjo-daro seal with the difference that seven figures of the lower register and the inscription on the lower one of the latter example are missing from the Dholavira one.

Stage IV with a habitational deposit of 4.40-4.60 m exhibited the mature urban phase of the Harappan culture which is widely known from a large number of excavated Harappan sites. The general planning and architecture of the preceding stage was maintained but with minor alterations.

During this stage, an overall phenomenal advance in the material culture is noticeable in pottery, seals, writing, weights and in a variety of ornamental and utilitarian artefacts made of metal, semi-precious stones, other stones, faience, steatite, shell, ivory, bone and clay. Quite surprisingly, with the beginning of Stage IV, the use of colourful clay for flooring and plastering went out of use altogether and never recurred at the site thereafter.

The Stage V is characterized by a general decline particularly in the maintenance of the city as it was most noticeably reflected in a deposit of 0-90 m in the citadel whereas in the Middle Town the accumulation amounts to 1.20 m. Civic regulations had certainly weakened despite the fact that the classical pottery, seals, script, weights and other items continued as before. Two fragments of vessels made out of a soft stone, perhaps chlorite, are important as they should be exotic belonging to the intercultural style. After which the site was deserted.

After a brief desertion, the site was occupied by the late Harappan in Stage VI. It is denoted by a 70 cm regular deposit and two phases of building activity, comprised of both the divisions of the citadel as well as the southern margin of the Middle Town. This stage presents Harappan culture in transformed manner, widely prevailing in Saurashtra and Gujarat. The late Harappan, however, maintained those segments of the outer walls which were vital to the existence of some of the reservoirs. For building the house, stones were robbed from the older structures. The lay-out also differed drastically. A new system of streets, alley-ways and housing sectors was introduced. Their houses were normally found raised right against the earlier fortification walls of the citadel.

Harappan elements such as pottery forms, fabrics and decorations continued, while new elements such as the Jhukar-style pottery perhaps from Sind, the burnished black, grey and black-and-red wares, occasionally embellished with dots and lines in fugitive white, in addition to a coarse incised pottery, possibly coming from the regions of Saurashtra, Gujarat and Rajasthan are noteworthy. Many Harappa elements like seals, weights, blades, triangular terracotta cakes, animal figurines were, however, in vogue. Most significantly, all the seals which have been collected so far, are devoid of figurative motifs although with well-cut inscriptions.

The overall picture that emerges is that of progressive impoverishment and crumbling urbanism. This stage is identical with Period IC at Surkotada, IB at Desalpur and upper levels of Pabumath all in Kutch and is also comparable to several other sites in Saurashtra and Gujarat.

The Stage VII was preceded by another desertion, now of a longer duration, as was reflected in the stratigraphy, particularly at such places where there were favourable locations for the accumulation of the eroded and collapsed debris. This ultimate habitation at the site lived for a solitary building phase. The people of the Stage VII were living in circular huts made of rubble-stones. Those huts are found to have been laid out without conforming to any planning and showing any preference for a particular area of the earlier habitated areas. Their structures may be seen scattered over a wide area that lay within as well as without the earlier city walls which must have been eroded considerably before the last occupants arrive there to settle down.

The present excavation has clearly confirmed that the front terrace of the North Gate was approached by a broad ceremonial pathway that ran along the fortification wall and emanated from another gate at a lower level which, in turn, opened onto the open space of the Stadium. The terrace and the said pathway together measure 79 m EW in length and 9 m in width at the lower end on the east and about 12 m near the front terrace of the main gate on the west. At the eastern end of the pathway, there is a larger chamber measuring 7.5 X 3.22 m. An opening once providing entry to the chamber from east was blocked subsequently.

In the East Gate-area partially exposed front terrace was traced upto the southeastern corner tower of the Castle. At the time of excavation, the terrace was found gradually sloping towards the south most probably due to the erosion caused during the time of desertion that followed the Stage V and preceded the Stage VI. At this corner, an imposing bastion, faced with dressed stone masonry, was also exposed. The terrace area between the East Gate and the bastion is found utilised by the people of Stage VI for raising two phases of their house buildings after leaving a narrow gallery along the rampart. Besides, the later people used it for both domestic and industrial activities as represented by kilns containing burnt clay lumps, white ash charcoal and other items of use.

The West Gate of the Castle, which permitted intercommunication with the Bailey, was designed in the form of a long corridor, pierced through the thickness of the defences. It was found considerably damaged by the gushing surface water. This long corridor measures 9 m in length and 2.2 m in width.

On all four sides inside the Castle, there were found pathways running all along the defences. At places, they were raised above the ground, and at others, continuously rising from the openings of the gate towards the corner towers or an intermediate salient. As noticed before, each gate was built in the thickness of the fortification wall and designed differently. The North Gate had two elevated chambers flanking a sunken passageway (fig. 9), the East Gate contained only one elevated chamber sided by a collateral passageway (fig. 10) and the Western one was, as already stated, designed like a sloping corridor with a few descending steps at the outer end.

During Stage V, the people were perhaps not in a postion to keep them, at least some of them, in their pristine glory. Because, it was now that the outer as well as inner openings of the East Gate were blocked considerably, leaving only a narrow passage for movement. Likewise, the gate-opening

providing access from the Stadium ground onto the ceremonical pathway was also narrowed down largely. In the Middle Town, a gate-complex facilitating intercommunication with the Lower Town and now partially laid bare by excavation, also perhaps met with a similar treatment of neglect. However, it was flanked by two bastions one of which remains unprobed, although it is visible on the surface.

In the middle town wherein the maximum deposit has, as already stated before, accounted for 8-65m. The evidence that was gathered has suggested that it was founded in the beginning of Stage III and remained flourishing in the following Stages IV and V(pl.XXI). The arterial street running from west to east remained uninterrupted right upto the gate in the east (pls. XX and XXII). From it, one major street in the western quarter and a few smaller streets and lanes branched off at right angles to run towards the north and the south. In Stage IV, the southern margin of about 50 m in width was cleared of the structures. It was only in Stage V when perhaps the municipal regulations were slackening it was started being encroached upon with new buildings. Subsequently, this area alone was brought under buildings by the late Harappans of Stage VI when it was secured by a massive fortification wall that was raised to delimit the settlement on the north. While rest of the area of the Middle Town was not used by the late Harappans for the purpose of residence. The late Harappan defensive wall differed from the normal principles of construction that was followed by the mature Harappans. Of Stage VII, only few circular structures can be seen here and there on the surface.

As mentioned earlier, the occupational deposit of the Lower Town amounted to 6.30 m in thickness. From the excavations (pl. XXIII), it could be ascertained that this division came in existence only during the sub-Stage III B and remained under occupation all through the Stages IV and V. There is no evidence of habitation during the Stage VI although few circular structures of Stage VII could be spotted on the surface.

The arterial street of Middle Town continued through its gate in the east to run across the Lower Town. That arterial street of the Lower Town was traced for a considerable length. It did not, however, run straight like its counterpart in the Middle Town. Although unhindered, it ran somewhat oblique and seen negotiating some turns making wide obtuse angles. Two major streets were found cutting it at right angles and so did a few subsidiary lanes and minor streets.

The previously exposed underground drain, originating from a stone paved platform furnished with a stone water chute (pl. XIX) on the eastern arm of the Castle was traced further west upto a length of 108 m along the east-west, then it turned making right angle towards the south to run for another 42.50 m before it took another right angle-turn to pierce through the thickness of the western arm of the Castle wall most possibly to cascade down to the Bailey. The stone-paved floor of the drain has a gentle slope. But, in the thickness of the wall, it became progressively narrower in width and shorter in height most plausibly to increase the velocity of the water which could flush out the solid sediments carried by the storm-water flowing in the drain more effectively. All along through its run, the drain is provided with at intervals with air ducts to let the air escape in order to facilitate easy flow of the moving waterbody. This drainage system seems to have started collapsing in Stage V despite some futile attempts for its rejuvenation before the effort was abandoned. The late Harappans also perhaps tried in vain to make it functional.

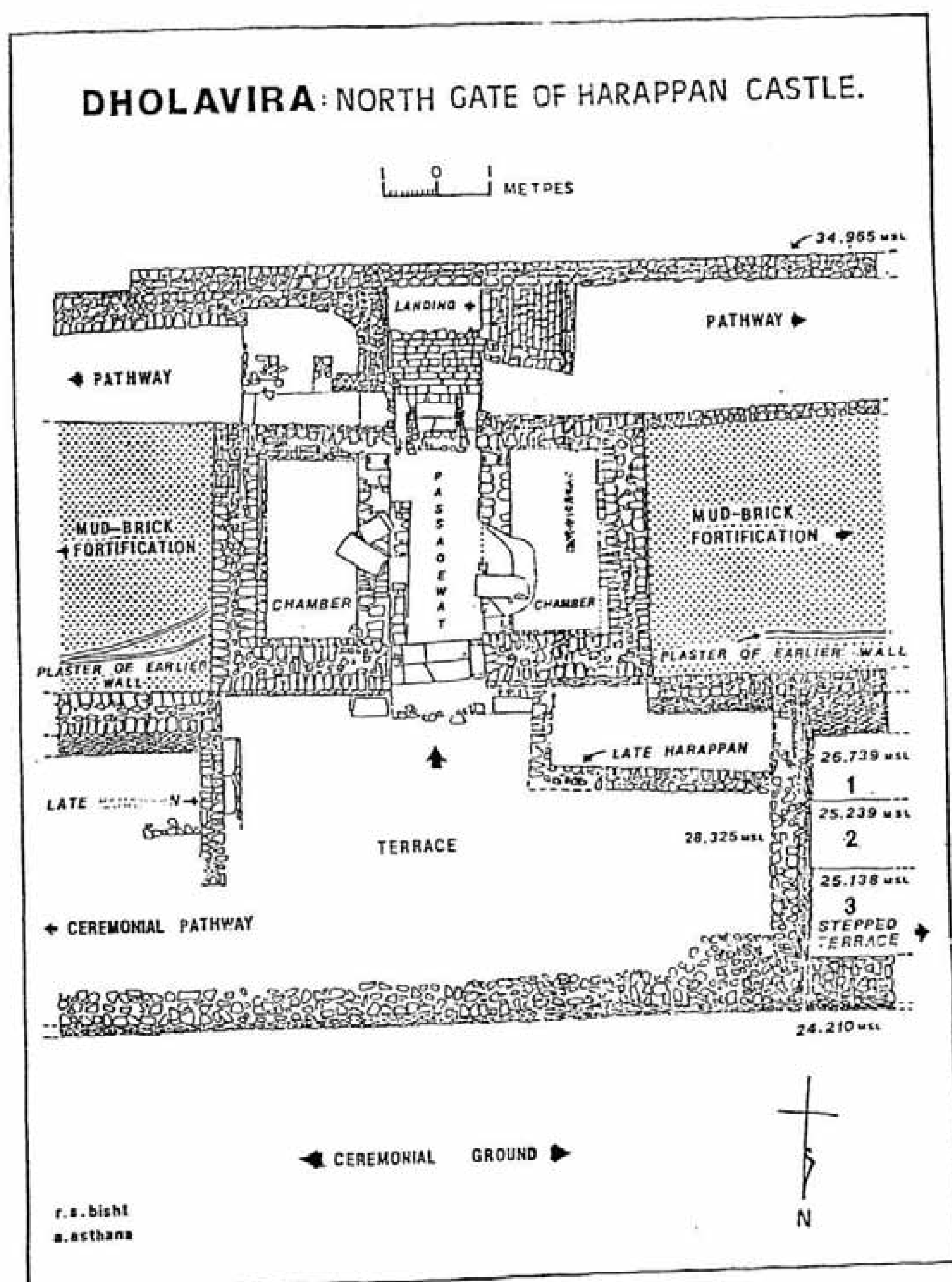

DHOLAVIRA: NORTH GATE OF HARAPPAN CASTLE.
1 0 1 METRES
34.965 MSL
LANDING
PATHWAY
PATHWAY
MUD-BRICK FORTIFICATION
MUD-BRICK FORTIFICATION
PASSAGEWAY
CHAMBER
CHAMBER
PLASTER OF EARLIER WALL
PLASTER OF EARLIER WALL
LATE HARAPPAN
26.739 MSL
1
25.239 MSL
2
28.325 MSL
25.138 MSL
3
STEPPED TERRACE
TERRACE
CEREMONIAL PATHWAY
24.210 MSL
CEREMONIAL GROUND
N
r.s. bisht
s. asthana

FIG. 9

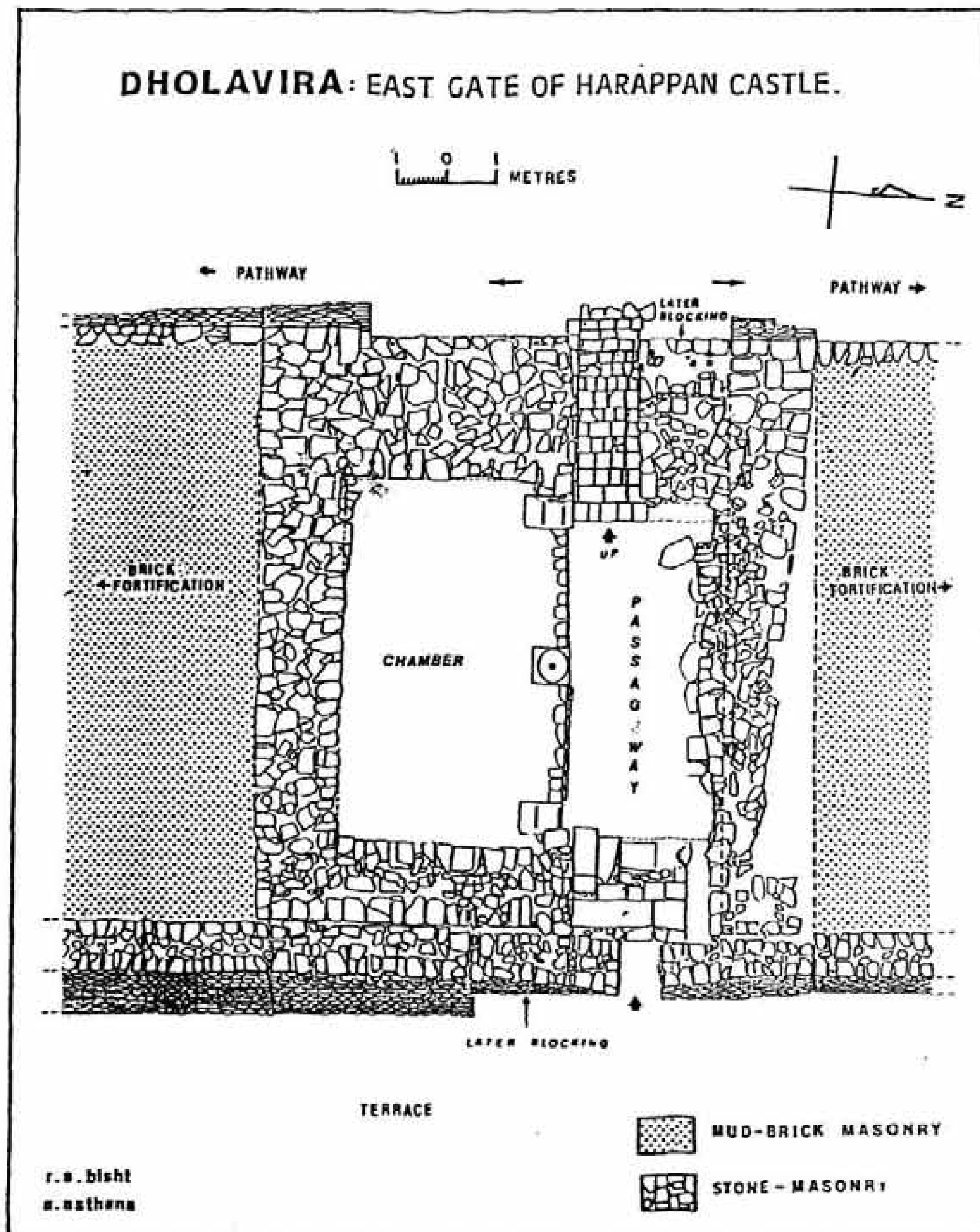

DHOLAVIRA: EAST GATE OF HARAPPAN CASTLE.
1 0 1 METRES
N
PATHWAY
PATHWAY
LATER BLOCKING
BRICK FORTIFICATION
BRICK FORTIFICATION
UP
CHAMBER
PASSAGEWAY
LATER BLOCKING
TERRACE
MUD-BRICK MASONRY
STONE-MASONRY
r.s.bisht
s.asthana

FIG. 10

To the south-east of Castle, near the Manhar channel, there was exposed a check dam provided with an opening at a higher level so that the surplus water after filling the broad bed of the torrent could flow into the southern series of reservoirs. The water-borne deposit accumulated against the check dam indicated the fall of the water. Besides, test probings were made at several places in different reservoirs located in the south as well as the west and everywhere it was found that the reservoirs were created by way of removing the earth accumulated on the undulating bed rock which was, however, not disturbed lest the removal of the hardened crust of it exposed the soft friable limestone sediments which would have quickly allowed the water to seep down. Furthermore, a broad causeway starting from near the northwestern corner of the Citadel was confirmed by putting a cross trench. It also betrayed that the Harappans did regular desilting of the reservoirs and dumped the earth on the couseways. Most significantly, the mature Harappan pottery was always found lying over the rock bed of reservoirs.

24. EXPLORATION IN DISTRICT SURENDRANAGAR.— Excavation Branch V of the Survey, Vadodara under the direction of G.T. Shende assisted by Y.S. Rawat and Ravinder Kumar discovered pre-historic paintings in a rock shelter at Thangadh near Chotila depicting a cluster of human figurines drawn in silhouette pattern and a few animal figurines in line drawings. These paintings are overlapped by a bold lettered inscription of fifth-sixth century AD. Besides, a few fluted cores of chert/jasper and numerous waste flakes of siliceous material have been collected from the low-lying area around the rock shelter.

HARYANA

25. EXCAVATION AT ARANGPUR, DISTRICT FARIDABAD.— A.K. Sharma after discovering a sprawling Acheulian site (28° 27'30"N; 77° 15'56"E) near village Arangpur(Anangpur), located about 30 km south of Delhi took a trial trench, assisted by S.B. Ota, S.S. Gupta, R.K. Dwivedi, N.K.Nimje, C.L. Yadav and P.C. Dogra of the Prehistory Branch of the Survey. This site lies on the quartzitic-sandstone outcrop which is the extension of the Aravallis of Tuglakabad-Gurgaon area. Trial trench measuring 3 X 3 m was taken up for excavation to ascertain the position of the implementiferous horizon in the area. The thickness of the implementiferous deposit varies from 0.25 to 0.40 m (pl. XXIV).

During the course of investigation two hundred and twenty-eight artefacts, both from the exposed section and the surface were collected from an area of about 75 sq km. Most of the artefacts are made on fine grained quartzite except few which are on sandstone. The raw material exploited are from the exposed outcrops in the area.

The assemblage comprising both finished and simple artefacts is as under.

TOOL TYPES

Finished Artefacts	*Total Number*	*Percentage*
Handaxe	79	34.65
Cleaver	50	21.93
Pick	2	0.88
Chopper (bifacial)	1	0.44
Discoid	3	1.16

Finished Artefacts	*Total Number*	*Percentage*
Knife	7	3.07
Point	2	0.88
Side scraper	12	5.26
Side-cum-end scraper	1	0.44
Stiff-edged scraper	7	3.07
Round scraper	5	2.19
Total	169	73.97%
Simple Artefacts		
Flake core	37	16.23
Side flake	8	3.5
End flake	5	2.19
Unfinished handaxe	6	2.63
Unfinished cleaver	2	0.88
Worked nodule	1	0.44
Total	59	25.87%
Grand Total	228	99.84%

Finished artefacts constitute handaxes, cleavers, picks, chopper (bifacial), discoids, knives, points, side scraper, side-cum-end scraper, stiff edged scrapers and round scrapers (pl. XXV). Of these handaxes (34.65%) and cleavers (21.93%) dominate over other varieties of finished tool. Apart from this, varieties of scrapers and knives also form the characteristic features of the assemblage. Occurrence of a large amount of simple artefacts and some unfinished tools alongside finished ones and the differential concentration of artefacts clearly suggest that it was a factory-cum-habitational site.

Since handaxes and cleavers constitute majority of the finished tools, a preliminary morphormetric analysis has been carried out on these tool types to ascertain the nature of assemblage and its position in the chronological frame of the Indian Acheulian culture.

In plan the handaxes comprise of limande, elongated cordiform, lanceolate, sub-cordiform, oval, amygdaloid and sub-triangular; whereas cleavers constitute rounded butt (oblique), rounded butt (convex), pointed short butt (oblique), pointed, short butt (transverse), pointed short butt (convex), pointed long butt (oblique), pointed long butt (convex) and straight butt.

As regards the primary form is concerned both handaxes and cleavers are mostly on cores (82.53%) rather than flakes(17.46%). The break up frequency of cores and flakes in handaxes is 93.58% and 6.41 % respectively, whereas in cleavers it is 64.58% and 35.41% respectively. Normally handaxes and cleavers of late Acheulian phase are on flakes but at Anangpur they are mostly on cores. It is

probably because of the fact that since the raw material used in Anangpur industry is of quartzitic-sandstone, the tools require more strength to avoid frequent breakage while performing heavy duty activities, which resulted in fabrication of handaxes and cleavers on cores. This observation is also corroborated by the dominant occurrence of tools with biconvex cross-section. Because of this reason almost all the handaxes and cleavers are bifacial in nature and there is almost complete absence of cortex on the surfaces.

The various categories of cross sections prevail in handaxes and cleavers and the frequency in their respective tool types show that the tools are symmetrical and achieved a morphological sophistication, the feature which is noticed in late Acheulian assemblage. Biconvex, lenticular and plano-convex cross-sections are dominant over other categories of cross-sections.

Length of the Anangpur handaxes range between 90-210 mm and the majority fall between 90 -170 mm, whereas cleavers range between 100 -180 mm within which the majority fall. The interesting feature observed in the length frequency distribution is that in case of handaxes, there is a wider range in length, whereas cleavers have got a very specific length range. It is probably, because, cleavers were meant for a specific purpose (s), whereas handaxes were used for various activities. This assumption is also supported by the number of handaxes dominant over cleavers and number of picks noticed in handaxes over cleavers in relative frequency analysis.

Shallow flake scars are observed on both handaxes and cleavers. The type and patterning of flake scars and retouching clearly suggest the use of controlled flaking to achieve final shape of the tools.

The shape of working edges in case of handaxes is mostly pointed, whereas cleavers have oblique to both right and left, straight and convex working edges. Nearly 44-73% and 29-78% of handaxes and cleavers respectively show either broken working point or working edges are damaged probably because of use. High-percentage of edge damage noticed in handaxes suggest their use for certain heavy duty activities.

From the overall morphometric observations made above on the assemblage, it clearly suggests that the Anangpur assemblage belongs to late Acheulian cultural phase. Moreover, degree of weathering on the artefacts also support this inference.

Absence of abraded (due to transportation) artefacts and occurrence of a large amount of waste products indicate the site to be of primary nature.

Keeping in view the recent study made on the migration pattern and palaeochannels of river Yamuna during Pleistocene, and the location of the late Acheulian site at Anangpur, there is every likelihood of getting some earlier cultural evidence along the palaeochannels and in adjoining hills of Aravallis, within 60 km west of the present course of Yamuna near Delhi.

26. EXCAVATION AT KUNAL, DISTRICT HISSAR.— The Department of Archaeology and Museums, Haryana, carried out excavations at Kunal, Tehsil Ratia, district Hissar under the direction of J.S. Khatri and M. Acharya, assisted by R.S. Dahiya and Kali Ram, where the previous archaeological operations revealed an earliest pre-Harappan or pre-Indus village settlement in India which is unique of its kind.

The site, 12 km north-west of Bhuna town is spread over an area of 3 acres, and lies on the left bank of the now dried bed of river Saraswati, which originates from the Adi Badri (district Yamunanagar) and passes through the various places of the State that joins finally with the river Ghaggar near Sirsa.

The archaeological excavations at Kunal brought to light three successive phases of the pre-Harappan culture. In the first phase, the people lived in pits, of approximately 2m diameter and 1.10m deep in the shape of rudimentary huts. Probably the conical superstructures of wood and grass were made over the pits for protection from extreme climate. A few post-holes have also been noticed around one of these pits. Presence of a hearth in every pit also proves this hypothesis that these were used for living purposes. They also practised agriculture and domestication of animals. Wheel made and hand made pottery, tools made of animal bones and micro blades of chalcedony have been found from this phase. Use of copper was very less. The occurrence of a few copper arrowheads and fish-books suggest that the community was also carnivorous.

The second phase is characterized by the occurrence of mud-bricks, which were used by the pit dwellers for the walls of pits. The brick-paved pit was of 2.75 m dia. The inhabitants of this phase also developed gradually the technique of constructions of mud-brick houses directly on the ground. The mud-bricks used for construction of houses as well as for paving the living pits, were moulded in different sizes such as 9 X 18 X 36,11 X 22 X 44 and 13 X 20 X 39,11 X 22 X 33 cm etc. But in each case the ratio of these brick sizes are either 1: 2 : 4 or 1: 2 : 3. To drain out the used water from the houses a solitary jar or a soakage pit was placed or dug outside the house in the street respectively. All the waste materials were dumped in the refuse pits, which were found in large number during the excavations. The disposal of their dead animals was also very interesting, as these were burnt before they were buried in the pits with various materials including chart bones, ash and charcoal. Probably charred bones of these animals were used for making tools. Agriculture and domestication of animals was already in vogue. There was an advancement in agriculture as evident from the discoveries of a few pit corn silos made during the excavations. A pit approximately lm dia, beautifully plastered with fine clay was probably used as corn silo.

There was no marked change in the standard of living as noticed in the earlier phase. The antiquities like arrowhead of copper, bone points, blade, beads of terracotta, steatite, faience, lapis lazuli, etc., were also recovered. Besides, beads of agate and copper, blades of chart and a spearhead of copper were also found. In this phase, there was also marked increase in the occurrence of pottery. The painted designs mainly comprise geometrical patterns in bichrome, showing black and white colours. The shapes of pottery included vases of different sizes, jars, bowls, basins, troughs, dish, dish-on-stand, etc. The pre-Harappan fabric 'D' and 'F' of Kalibangan was also found in this phase. Black-and-red ware and other variety of red ware appear for the first time at Kunal. The discovery of a medium size kiln for making pottery and bricks in this phase, is also significant.

Finally in the last phase, there are square and rectangular rooms including those used as bathrooms and kitchen. The bricks used in the construction of these houses were made of fine and well-levigated clay. The sizes of the bricks were 11 X 22 X 44, 10 X 20 X 40 cm, etc.

The pre-Harappan ceramic of Kunal comprise pots of different shades of red and buff which are painted beautifully with black and white colours. The designs show geometrical animal motifs. A few

pots also contain engraved designs on both outside and inside. Use of black and red ware pottery, fabric 'D' and 'F' type pottery of Kalibangan was also continued. Important shapes include different sizes of vases, cups, beakers, bowls, basins, troughs, dishes-on-stand, lids, etc. Use of shell bangles and semiprecious stone-like carnelian, steatite for ornaments also increased. Besides, copper and bone implements also continued to occur. A beautiful antler was found for the first time in this phase.

The most important discovery from the pre-Harappan level, however, consists of seals made of steatite, which are perhaps the first of its kind in India, as no other site has so far yielded any such evidence in the pre-Harappan context. Although these seals bear a close resemblance to the Harappan specimens in so far as their shape and moulding style are concerned, but the motifs engraved on them show a marked difference. As in case of the pre-Harappan pottery which bear only geometrical patterns, all the four seals discovered here contain similar geometrical pattern, whereas the major class of Harappan pottery bear only natural motifs like plants, trees, animals, birds, etc., and same is the case with their seals also.

KARNATAKA

27. EXCAVATION AT HAMPI, DISTRICT BELLARY.—– The Bangalore Circle of the Survey, under the direction of K.P. Poonacha, assisted by S.V. Venkateshaiah, C.S. Seshadri, W.V.S. Narasimham, Anandateertha, T.P. Balakrishna Unnithan and M.M. Hadpad, resumed excavation at Hampi in the area located north-east of Saraswati temple, with the objective of exposing the complete plan of the buried structures, to understand their functional aspect and relationship with the structures like the temple and water works in the vicinity on the one hand and the structures exposed in the Royal Enclosure on the other.

Excavation in an area of 2600 sq m has laid bare complete plan of a palatial structure (STR-I) and to its west the partial plan of another structure (STR-II). The extant evidence indicates that these are interconnected, independent structures.

STR-I is an east facing, fairly large structure (36.35 X 22.25 m) with its longer axis in east-west (pls. XXVI-XXVII). Ithasa 'U' shaped courtyard rising in different levels. The levels are differentiated by moulded courses of *adhishthana* comprising an *upana,* an *adho-kumuda,* a *kantha* and *urdhva-kumuda.* The *adhishthana* is lime plastered repeatedly. The uppermost landing has a central platform. The landings are reached by flights of steps, symmetrically positioned either at the southern end or at the middle. Some are flanked by *yali* balustrades executed in stucco medium. The walls of the structure are built of cut stone masonry set in mud mortar. The thickness of the walls vary from 0.90 m to 1.20 m. The inner surface of the walls is plastered with lime mortar. The floor of the landings, exists only in patches, is also repeatedly lime plastered.

The courtyard of STR-I is approached by two entrances, one from south and the other from north. The southern main entrance (1.63 dia wide) has a passage flanked by platforms on the south and an 'L' shaped screen wall on the north. This screen wall is built of rubble masonry set in mud mortar and is covered by lime plaster. The northern entrance is a narrow one (0.87 m wide). A much disturbed rectangular platform is exposed to the east of this entrance abutting the northern wall.

The first landing rises to a height of 0.54m from the plastered floor level of the courtyard and is accessed by two flights of steps. The steps are plain and covered by lime plaster. Four pillar bases are traced adjacent to the *adhishthana.* This landing has a rectangular chamber each on the north and the south. These chambers are built of rubble masonry walls set in mud mortar covered by lime plaster. Corners and wall surfaces show stucco mouldings and pilaster designs. The chambers have *kakshasanas* alround and open into the hall of the landing. The southern chamber opens into a squarish courtyard (3.20 m sq) on the south. This chamber has a rectangular platform (3.50 X 2.35m) to its west and an entrance on the east. This eastern entrance leads to a large courtyard on the south through another chamber. This elaborate arrangement with zig-zag entrances obviously formed part of the security arrangements.

The second landing rises to a height of 0.45 m from the first and has the usual *adhishthana* mouldings. It is reached by two flights of steps on the south and a single broad step at the middle. It also has four pillar bases corresponding to those of the first landing. This landing is a 'U' shaped courtyard flanked by platforms on north and south. The platform have four equidistant pillar bases with east-west orientation. Incidentally, the *adhishthana* of the second landing forms the base for the uppermost landing. The uppermost landing is approached by a flight of three steps provided at the centre. These steps are of cut slabs, covered with lime plaster and flanked by the disturbed stucco *yali* balustrades. The floor is highly disturbed, brittle and blackish in colour. A heavy dump of charcoal, lime concrete and ash was noticed on the floor. Highly fragmented stone mouldings of the *adhishthana* and the exfoliated architectural members in the dump suggest extensive burning activity. The fallen heavy chunks of lime concrete also suggest the nature of the roof that the structure had.

The uppermost level has a room each on north and south and a stone platform at the centre. This platform (pl. XXVIII A) is accessed by flights of steps with *yali* balustrades on the south and east (pl. XX VIII B). The central platform is highly disturbed and the extant portion on the southern side alone retains all the usual *adhishthana* mouldings. The platform was surrounded by a lime plastered passage as indicated by part of the extant flooring. A heavy dump of fallen stucco members was noticed on the southern passage. The dump comprises of ornately designed pilaster fragments, pot-foliage, corbels, flower medallions, birds, *yalis,* etc., all executed in fine stucco medium.

Structure-II, also facing east, is located to the west of STR-I. Excavation in the current season has revealed only a partial plan of this structure (pl. XXIX). The extant plan shows a 'U' shaped courtyard in four successive levels from east to west. Unlike STR-I, here the different levels are not demarcated by the usage of *adhishthana* mouldings. The difference in height of the levels varies only from 5 to 10 cm. The uppermost level is a rectangular chamber, opening into the second level on its east. The floor of the second level had a dump of fallen stucco designs of corbels, pilasters, flower medallions, foliage designs, flying *gandharvas, hamsas,* etc. Further east is a plastered courtyard the plan of which is much disturbed. Two different phases of structural activities are observed here. The exterior of the western part has typical *adhishthana* mouldings and bears masonry marks comparable to those of the stepped tank in the Royal Enclosure. This part of STR-II belongs to the first phase of structural activity. The wall built of cut stones and the slabs set in mud mortar, covering about a metre on the southern side of the original structure, obviously belongs to the second phase.

This structure has a platform around as suggested by the extant portions on the southwestern side and the flight of steps. The passage between the central structure and the platform was completely plastered time and again. Four stone mortars were exposed almost abutting to the southern wall of the structure. One of them contains an inscription *'Raghupati'* on its top surface in medieval Kannada characters. Another mortar is shaped like a pounder and bears resemblance with those depicted in the relief sculptures on the Mahanavami Dibba and Hazara Ramachandra temple.

A massive wall, 1.35 m wide, built of cut stone masonry set in mud mortar, encloses STR-II. The eastern wall of this enclosure, in fact, acts as a common enclosure wall for STR-I and STR-II. Near the southwestern corner of STR-I is a sham entrance (0.80 m wide), intercepting this common *prakara* wall and connecting STR-II. Along the eastern periphery of the western enclosure wall of STR-II, a water carrier, built of rubble set in lime mortar and lime plastered surface has also been traced.

The antiquities retrieved from the excavation include five gold coins of Vijayanagara period; 25 copper coins, pieces of copper ring; nails and linch pins of iron; beads of crystal and other semiprecious stones and terracotta besides, glass and bangle pieces. Fragmentary stucco figures like human heads, animals, birds, foliage and pendant motifs (pl. XXX A) besides, *gandharvas* riding on *makaras* (pl. XXX B) which once embellished the walls and ceilings of the structure were also encountered. A pair of neatly executed sculptures of elephants in granite and stone mortars, probably used as pounders, are among the important antiquities in lithic medium. The ceramic industry is represented by the occurrence of plain and decorated medieval black and red ware, few of them burnished, besides a few sherds of Chinese porcelain.

The Directorate of Archaeology and Museum, Government of Karnataka continued excavations in the Nobleman's Palace (17) area which yielded a large enclosure wall with three rooms at the western end along with a flight of steps. This faces east and the rooms on western end are provided with a passage in the middle. The rooms are of different size, eg., north-west (1 .85 X 3.25m), south-west (2 X 3 1.5m) and the centre (2 X 3 1.5m). Besides, pottery and fragments of bone, copper coins, stone sculpture of Virabhadra and metallic image of Krishna deserve mention.

28. EXPLORATIONS IN DISTRICTS BELLARY AND CHITRADURGA.—The Directorate of Archaeology and Museum, Government of Karnataka, conducted explorations in Bellary and Chitradurga districts and noticed the following cultural remains:

Taluk	*Village*	*Nature of remains*
Chitradurga	Dyamarvanhalli	*Sapta-matrika* panel (fifteenth century AD) and sculpture of Indrani (fourteenth century AD)
-do-	Gopur	Image of Bhairava (fifteenth century AD)
-do-	Mallapur	Hero-stone (thirteenth century AD)
Hiriyur	Abbanahole	Sculpture of *dvarapala* (seventeenth century AD)
-do-	Adival	Hero-stone (seventeenth century AD)
-do-	Ambalagere	*Naga*- stone (eighteenth century AD)

Taluk	*Village*	*Nature of remains*
Hiriyur	Babbur	Hero-stone (fifteenth century AD)
-do-	Bennehalli	Hero-stone (sixteenth century AD)
-do-	Bommakkanhalli	Icon of Bhairavi (thirteenth century AD)
-do-	Dharnapur	Hero-stone (seventeenth century AD)
-do-	Hariyabbe	Hero-stone (fifteenth century AD)
-do-	Hartikote	Image of Anjaneya (seventeenth century AD)
-do-	Kabikere	*Siva-linga* (sixteenth century AD)
-do-	Kartikonahalli	San-stone (sixteenth century AD)
-do-	Lakkavanahalli	Sculpture of *Nagini* (fifteenth century AD)
-do-	Mulagonahalli	*Sapta-matrika* panel (fifteenth century AD)
-do-	Mykalor	Sari-stone (seventeenth century AD)
-do-	Vaddikere	Naga-stone (seventeenth century AD)
Kudalogi	Kottur	Two copper coins of Chola period (tenth century AD)

29. EXCAVATION AT BUDIHAL, DISTRICT GULBARGA.— As pan of his renewed research on the ashmounds of south India K. Paddayya of the Deccan College, Postgraduate and Research Institute, Pune, undertook an excavation at the ashmound site near Budihal (16°22'N; 76°23'E), situated in Shorapur taluk of district Gulbarga. This neolithic site, discovered by Paddayya in 1965, is about a km north of the village and is situated on a sandstone plateau (500 m ASL) standing about 20m above the surrounding ground level. It lies one km and a half from the left bank of the river Don, a tributary of the river Krishna. The site is defined on its northern and eastern sides by ravines with perennial waterpools resulting from seep-spring activity.

This site has two ashmounds which are separated from each other by a distance of about 100m. Ashmound 1 is oval-shaped and measured 70 m north-south and 45 m east-west; it has a maximum height of about 3 m. The second mound (Budihal II) is circular on plan and measures about 40 m across. Neolithic habitation *debris,* varying from 15 cm to more than a metre in thickness, occurs on all four sides of the central patch containing the ashmounds proper. The ancient site measures about 400 m north-south and 300 m east-west. A large part of the sandstone plateau including the area covered by the Neolithic site is under cultivation. A portion of the northern half of the site is occupied by a deserted medieval village site. Ashmound 1 and the settlement area around it have been quarried by the local people to obtain soil for constructional purposes. More importantly, practically the whole of ashmound 1 area has been recently acquired by the Irrigation Department of the Government of Karnataka to rehabilitate the present day village of Budihal which has been affected by water logging conditions created by a major irrigation canal forming part of Upper Krishna Project.

Earth-digging activity and the long road marker-cum-drainage ditches excavated by the Irrigation Department exposed occupation deposit ranging up to a metre in thickness. During his explorations at the site Paddayya collected typical Neolithic cultural material comprising pottery, stone artefacts and animal bones from all over the area. During the current field season a regular excavation was conducted at the site with the following objectives in view:

a) to know the ashmound stratigraphy and ascertain the cultural affiliations of various layers; and

b) to understand the nature of occupation deposit around ash formations and ascertain their relationship with the latter deposits.

A long trench (Trench 1), measuring 60m long and lm broad and oriented north-south, was excavated across ashmound 1. For purposes of recording, it was divided into one-metre grids numbered 1 to 60 from south to north. The mound has its maximum thickness in the central part and slopes down gently on all sides. Natural soil was reached at a depth of about three metres. The following stratigraphy (from top downwards) was exposed:

1) loose/somewhat compact greyish soil (5 to 60 cm thick) of secondary origin; formed from underlying vitrified ash deposit due to ploughing and other post-Neolithic activities and yielding Neolithic objects as well as modern potsherds and bangle pieces and medieval potsherds;

2) vitrified ash (10 to 80 cm thick) with pockets of granular ash;

3) variegated brownish layer consisting of decomposed cowdung (10 to 50 cm);

4) brownish soft ashy layer (10 to 25 cm thick);

5) vitrified ash (40 to 120 cm) showing discontinuous lenses of soft or granular ash (3 to 5 cm);

6) compact, fissured ash (15 to 110 cm);

7) layer of decomposed cowdung (maximum thickness 1 .5m) containing lenses of soft/granular ash and fine clay;

8) dark greyish (10 to 35 cm) habitation soil;

9) light greyish habitation soil (10 to 35 cm);

10) light brownish habitation soil (10 to 35 cm); and

11) natural soil (sterile brownish/blackish soil) deposited over sandstone surface.

This trench produced crucial evidence regarding the age and formation of ash deposits. Barring some modern objects and medieval potsherds from layer 1 the cultural material recovered from the trench exclusively belongs to the Neolithic culture, which comprises grey and red pottery, blade tools of chert, rubberstones, hammerstones and quern pieces, bones of both domestic animals (mainly cattle bones with small quantities of sheep/goat and pig bones) and wild species (deer and antelope species), and plant remains representing three wild species - the Indian jujube *(Zizyphus jujuba* Lamak.), the Indian cherry? *(Cordia* sp.) and the emblic myrabolan *(Phyllanphus* sp.)- It is also interesting to note that uncarbonized plant fibres were found as patches of a thin bedding in the basal portion of layer 7.

A small quantity of human skeletal remains comprising skull fragments, teeth, phalanges, etc., were found in a dispersed condition (in grid nos. 19 and 20) in soft ash mixed with brownish soil forming part of layer 5. A large number of charcoal samples were collected from various layers of this trench for carbon-14 dating.

Layers 2 to 7 consisted of either decomposed or burnt cowdung taking the form of vitrified or soft ash accumulations; and these levels account for the major portion of the sediment constituting the ashmound. All these layers varied considerably both in terms of horizontal extent and in thickness. This clearly proves that, contrary to the views of previous workers who visualized cake-layer stratigraphy in respect of ashmounds, there was considerable variability in sedimentation from the one part of the mound to another. In other words, the life history of the mound was not one of dead uniformity but consisted of a series of depositions of cowdung of unequal thickness (sometimes burnt and sometimes simply decomposed) which eventually contributed towards the formation of a mound-like feature.

Layers 8 to 10 were true occupation levels and yielded cultural material in much larger quantities than layers 2 to 7. These levels revealed the presence of post-holes and lines or arrangements of stone blocks, hearth-like features, and burnt clay/ash clods with bamboo impressions. Of particular significance are an alignment of six post-holes (grid nos. 10 to 12) dug into the natural soil and remains of a collapsed and burnt structure of clay and stones found in layer 9 (grid nos. 5 to 7). However, it is important to note that human occupation as represented by these levels was confined to the extreme southern (grid nos. 1 to 17) and northern (grids 57 to 60) margins of the mound. Considering together the layers representing both human habitation and cowdung deposition, one is probably justified in making the inference that the peripheral zone of the ashmound was used for human occupation in the initial stages of site history when garbage disposal in the form of cowdung dumping was taking place on a limited scale in the central portion and that the human occupation spread radially around the spot as cowdung dumping and its burning emerged as an intensified activity at the settlement.

Two trenches (2 and 3) were dug in the habitation area. These measured, respectively, 5 X 5 m and 4x4 m, and lay 6 m and 120 m south of ashmound 1. These were excavated up to the depth of 50 cm and 45 cm respectively in this season and will be reopened during the next season. Two layers were noted in Trench 2: loose and light greyish soil (25 cm thick) and compact and dark greyish soil (25 cm thick). Both these levels yielded Neolithic cultural material comprising pottery, blade tools, quern pieces and rubberstones/hammerstones and animal bones comparable to the material from Trench 1. No less important, this trench yielded two pieces of evidence relating to structures : a) six post-holes arranged in an arc-like fashion, and b) a 5 cm thick band of compact ash probably forming part of a dwelling floor.

Trench 3 exposed three levels as follows : a) compact brownish soil (up to a depth of 20 cm below surface); b) compact blackish soil (up to 35 cm) below surface; and c) dark greyish soil (up to 50 cm below surface). Typical Neolithic material comprising pottery, blade tools, animal bones, etc., was found in these levels. Structural features were noted in this trench also. In layer 2 a semi-circular arrangement of sandstone blocks was found in the western part of the trench, and it continued into the undug area. Layer 3 exposed a large number of sandstone blocks which probably originally formed part of a large oval or circular structure with two or three inner compartments (about a metre across) meant for storage purposes.

In view of the identical character of the cultural materials recovered from the three trenches it is beyond doubt that both the ashmound and the settlement area at Budihal belong to the Neolithic culture of south India. Iron Age cultural material and the slags and other by-products of iron working are conspicuous by their absence. The evidence obtained from surface survey and excavation clearly probes that the Budihal site was a Neolithic pastoral settlement where cow-dung resulting from nocturnal penning of cattle and other domestic animals was being disposed off at one or two conveniently located spots and, lacking its regular use for manuring fields, was being burnt periodically. The reasons for burning were probably both ceremonial and practical in nature.

One other important feature of the Budihal site pertains to the occurrence of an extensive chert workshop on the western side of the area containing ashmounds and settlement area around them. This workshop covers agricultural land measuring about a hectare in extent and yielded a large number of chert nodules procured from nearby veins in limestone, small hammerstones and enormous quantities of chert chips and waste flakes. Considering the large size of the workshop it is very likely that finished tools from this site were being carried over to other Neolithic sites located far and near.

30. EXPLORATION IN THE SUBMERGENCE AREA UNDER BHIMA (FLOW) PROJECT, SANNATI, DISTRICT GULBARGA.— In continuation of last year's *(1990-91,* pp. 30-31) work, the Bangalore Circle of the Survey undertook further exploration to locate the antiquarian remains and for their documentation in the submersible area under the Bhima (flow) project at Sannati under the guidance of K.P. Poonacha assisted by K.V. Rao, P.S. Sriraman, C.S. Seshadri, M.V. Visweswara, B.K. Unnithan,N. Anandateertha M.M. Hadpad. During the exploration, the following discoveries were made.

Three more localities yielding middle palaeolithic tools were located at Hotinmadu, Rajwal and near the ferry-point to Sirwal from Sannati. The types conform to scrapers, blades and points made on chert, jasper and other materials.

At Hasargundgi, an early historical mound was located. The surface findings include ceramics of black-and red-ware, red ware and brick-bats. Also noticed were the fragmentary sculptural remains of a *yaksha* (pl. XXXI) with a neck ornament bearing Gaja-Lakshmi motif in the pendant, fragmentary *stambhas* with lotus medallion and lenticular grooves in the sides, fragmentary coping stones with horse, lion, elephant figures, octagonal pillars, their bases, etc. These indicate possibly a structure with railing.

Temples were noticed at Narboli, Kannur, Chamnur and Madgi. These ter pies belong to medieval period. Besides, many sculptural and epigraphical remains were also encountered.

Following is a consolidated list of villages explored along with the cultural assemblage noticed.

Taluk	*Village/Site*	*Nature of remains*
	Right bank	
Jewargi	Hotinmadu (16° 53'10"; 76° 57' 04")	Middle palaeolithic implements
-do-	Narboli (17° 00’ 23"; 76° 55' 10")	Temples of lime stone (twelfth-fourteenth century AD)

Taluk	*Village/Site*	*Nature of remains*
Jewargi	Rajwal (16° 58'52"; 76° 56'12")	Middle palaeolithic implements
Shahpur	Anbi (16° 51' 13"; 76° 54'01")	Inscribed *chhayapratima* (second century AD) and group of temples (eighth-ninth century AD)
-do-	Hasargundgi (16° 48'42"; 76° 54'43")	Middle palaeolithic and mesolithic tools, stupa (?) mound, *chhayapratima.*
	Sirwal (16° 48' 38"; 76° 53' 38")	Middle palaeolithic tools, stray neolithic axe, temples (eighth-twelfth century AD), stepped-well (eighth-ninth century AD) and inscription
	Left bank	
Chitapur	Chamnur (17° 00'22"; 76° 55'25")	Temple of fifteenth century AD
-do-	Kadabur (16° 59'03"; 76° 55'25")	Sculptures belonging to fourteenth-fifteenth century AD
-do-	Kanganhalli (16° 50'24"; 76° 56'16")	Stupa mound, kiln area (?), limestone sculptures, inscriptions of first-second century AD, *chhayapratima*
-do-	Kannur (17° 02' 32"; 76° 55' 39")	Temples (eighth-fourteenth century AD), inscriptions (eleventh-thirteenth century AD), bastion (seventeenth-eighteenth century AD)
-do-	Kollur (16° 52'51"; 76° 57'66")	Stray Acheulian tools, habitation mound of early historic period, brick scatters, temples (ninth-twelfth century AD), inscriptions, fortification (late medieval period)

Taluk	Village/Site	Nature of remains
Chitapur	Kulkundi (16° 57’ 23"; 76° 56" 34")	Sculptures (fourteenth-fifteenth century AD)
-do-	Madgi (16° 54’ 03"; 76° 56' 36")	Temple (twelfth century AD), sculptures and fort (seventeenth-eighteenth century AD)
-do-	Rampurhalli (15° 58' 53"; 76° 42' 23")	Brick scatters, terracotta objects and hero-stone
-do-	Sonti (Sannati) (16° 49' 39"; 76° 54' 26")	Lower palaeolithic tools of Acheulian stage, middle palaeolithic tools, habitation mound, inscriptions of Asoka (third century BC) and later periods, artefact scatters, stupa mounds, fortification of early historic period, sculpture of limestone (first-second century AD) and later period temples, etc.

31. EXPLORATION IN DISTRICT KOLAR.— In continuation of earlier *(1989-90,* pp. 38-40) work, P.S. Sriraman of the Bangalore Circle of the Survey brought to light the following antiquarian remains in Mulbagal taluk of Kolar region during the course of village-to-village survey.

Taluk	Village!Site	Nature of remains
Mulbagal	Bairakur (13° 14' 20"; 78° 29' 44")	Temples and hero-stones of medieval period
-do-	Chimna Nagvara (13° 13'30"; 78° 34'00")	Megalithic burials
-do-	Devaraya-samudram (13° 08' 00"; 78° 17'56")	Post-Vijayanagara temples
-do-	Gujjamarandahalli (13° 13'10"; 78° 20'40")	Vijayanagara temple
-do-	Hebbani (13° 16' 56"; 78° 33',54")	Inscriptions and hero-stone of tenth century AD, *Sapta-matrika* temple, loose sculptures of Chola period

Taluk	*Village/Site*	*Nature of remains*
Mulbagal	Khadripura (13° 10'10"; 78° 22'05")	Post-Vijayanagara temple
-do-	Mudiyanur (13° 13'30"; 78° 13'54")	A set of copper plates dated in first half of fourth century AD, Isvara temple with inscriptions in Kannada of tenth century AD, Vishnu temple of Chola period, inscriptions, hero-stones of tenth century AD and loose sculptures
-do-	Nangili (13° 11'50"; 78° 31' 10")	Habitation site of early historical period, hero-stones of tenth century AD *Sapta-matrika* temple of Chola period
-do-	Petandahalli (13° 14'30"; 78° 30[1] 10")	Memorial stone of tenth century AD
-do-	Upparahalli (13° 12' 12"; 78° 33' 20")	Early historical mound, *matrika* temple of Chola period

32. EXPLORATION IN DISTRICT SHIMOGA.— C.S. Seshadri of the Bangalore Circle of the Survey brought to light the following antiquarian remains in Sorab taluk of district Shimoga during the course of village-to-village survey.

Taluk	*Village/Site*	*Nature of remains*
Sorab	Agasanahalli (14° 10'; 75° 36')	Inscribed hero-stones, san'-stones and loose sculptures of Vishnu and Ganesa of twelfth century AD
-do-	Andigi (14° 22'; 75° 09')	Hero-stones inscribed with Kannada characters of twelfth century AD, loose sculptures of Surya and Mahishamardini of Vijayanagara period
-do-	Arekoppa (14° 13'; 75° 21')	Inscribed hero-stones of later Chalukyan period

Taluk	*Village/Site*	*Nature of remains*
Sorab	Bilavani (14° 23'; 75° 12')	Inscribed hero-stones of Hoysala period and *sati*- stones
-do-	Chatikoppa (14° 12';75° 30')	Inscribed hero-stones, loose sculptures of Vishnu of twelfth century AD and *sad*- stones
-do-	Chatradarfelli (14° 21'; 75° 14')	Amritesvara temple of post-Vijayanagara period, inscribed hero-stones of twelfth century AD and *sati*- stones
-do-	Chennapura (14° 10'; 75° 24')	Sari-stones
-do-	Chikkasavi (14° 14',75° 15')	Sari-stones of post-Vijayanagara period
-do-	Chikkabbur 14° 12'75° 38'	Inscription of Vijayanagara period
-do-	Chikkaidagodu (14° 12'; 75° 32')	Hero-stone of fourteenth century AD
	Chittur (14° 15'; 75° 18')	Siva temple, loose sculptures, inscribed hero-stone, sari-stones, all of later Chalukyan period and temple of post-Vijayanagara period
-do-	Doddikoppa (14° 12'; 75° 36')	Cannon, hero-stone and loose sculpture of Ganesa of post-Vijayanagara period
-do-	Gangavalli (14° 15'; 75° 30')	Sari-stone
-do-	Gerakoppa (14° 23'; 75° 12')	Sari-stone

Taluk	*Village/Site*	*Nature of remains*
Sorab	Gudigina-koppa (14° 15'; 75° 21')	San-stone
-do-	Harur (14° 10'; 75° 21')	Inscribed hero-stones and *sati*-stones of eleventh-twelfth century AD
-do-	Hesari (14° 10'; 75° 14')	Inscribed sari-stones of tenth-eleventh century AD and inscribed hero-stones of twelfth-thirteenth century AD
-do-	Hiravalli (15° 25'; 75° 07')	Twenty-three hero-stones and loose sculptures of Parsvanatha of later Chalukyan period
-do-	Hlirekasavi (14° 15'; 75° 15')	Inscription of post-Vijayanagara period, hero-stone of twelfth-thirteenth century AD and buried brick structures
-do-	Hiremagadi (14° 14'; 75° 30')	Inscription in Kannada characters of eigth-ninth century AD, Jaina *basti* and inscribed hero-stones of later Chalukyan period
-do-	Hunasavalli (14° 11'; 75° 32')	Inscribed hero-stone of tenth century AD
-do-	Indavalli (14° 10'; 75° 15')	Inscriptions of tenth and twelfth century AD
-do-	Jirlekoppa (14° 20'; 75° 11')	*Sati*- stones of post-Vijayanagara period
-do~	Kamanahalli (14° 13'; 75° 32')	Inscriptions, hero-stones and sari-stones of post-Vijayanagara period
-do-	Karekoppa (14° 14'; 75° 18')	Sari-stone of post-Vijayanagara period

Taluk	*Village/Site*	*Nature of remains*
Sorab	Kavadi (14° 14'; 75° 20')	Inscribed hero-stones of twelfth century AD in Kannada characters, loose sculptures of Vishnu and Gaya-Lakshmi of post-Vijayanagara period
-do-	Kodihalli (14° 10'; 75° 38')	Hero-stones of thirteenth-fourteenth century AD
-do-	Kolagunasi (14° 15'; 75° 30')	Loose sculptures of Durga and Vishnu of post-Vijayanagara period
-do-	Manamane (14° 11'; 75° 21')	Inscription and inscribed sari-stones of eleventh- twelfth century AD
-do-	Manchi (14° 11'; 75° 26')	*Sad-stone* of post-Vijayanagara period
-do-	Mavali (14° 10'; 75° 22')	Inscriptions and inscribed hero-stones of Rashtrakuta period
-do-	Mudi (14° 14'; 75° 38')	Inscribed hero-stones and Sari-stones of tenth-eleventh century AD
-do-	Nagavadi (14° 31'; 75° 12')	Loose sculpture of Nandi of later Chalukyan period
-do-	Neralige (14° 09'; 75° 35')	Temple, loose sculptures of Mahishamardini, *Sapta-matrika* and Ganesa of later Chalukyan period
-do-	Suttakote (14° 13'; 75° 24')	Sari-stone
-do-	Tallur (14° 10'; 75° 33')	Sari-stone
-do-	Tattur (14° 12'; 75° 30')	Six inscribed hero-stones, loose sculptures of Nandi and Mahishamardini, all of later Chalukyan period

Taluk	*Village/Site*	*Nature of remains*
Sorab	Toravanda (14° 10'; 75° 37')	Ruined brick structures of sixth-seventh century AD and a temple of eleventh-twelfth century AD
-do--	Uraganahalli (14° 08'; 75° 37')	Loose sculptures of Durga and Mahishamardini of later Chalukyan period
-do-	Vaddagere (14° 13'; 75° 30')	Sari-stone
-do-	Yalaballi (14° 11'; 75° 22')	Sari-stone
-do-	Yennekoppa (14° 18'; 75° 33')	Inscribed hero-stones, loose sculptures of Vishnu and Sari-stones of thirteenth-fourteenth century AD

MADHYA PRADESH

33. EXPLORATION IN DISTRICT BETUL.—A. K. Sharma, assisted by S.B.Ota, P.S.Pashine,P.C.Dogra of the Prehistory Branch of the Survey, discovered microlithic sites at village Morandhana and Somlapur. In both the sites artefacts are associated with red sandy sediments overlying the Deccan trap. The site at Morandhana (21° 54'N; 78° O4'E)is an extensive one located on the bank of a stream. The artefacts found at this site comprise of varieties of scrapers, retouched blades, blade cores, flake cores, blades, etc., made up of chert and chalcedony. The site at Somlapur (21° 51' N; 78° 08'E) lies on a ridge with an extension of nearly 2 km.

Megalithic stone circles are located on a rocky ridge about 250 m west of village Chhaval (21° 57' N; 78" 12' E) in Multai tehsil. The average diameter of these stone circles is 4-5 m. Locally available Deccan trap boulders were used for laying out the circles. Most of these stone circles are badly disturbed due to cultivation. The site also yielded a few microliths of crypto-crystalline material from the surface.

34. EXPLORATIONS AT WARORA, DISTRICT CHANDRAPUR.— A brief field survey was conducted by the Deccan College, Pune at Warora in district Chandrapur near Nagpur at the invitation of Vikas Amte who had collected numerous fossils (vertebrates and shells) and Stone Age tools in the areas around Anandwan. Antiquities like pottery, terracotta figurines, beads, coins, inscriptions of historical period and animal bones, etc., have, been discovered earlier in addition to the above discoveries in the area. The collection was examined for identification and some more fossils and Stone Age tools were also found. The study of these revealed that this was a factory site. However, for a better assessment of the findings in geo-archaeological perspectives, a detailed field survey is proposed for the next year's field season.

35. EXCAVATION AT WASVI, DISTRICT DHAR.—The Bhopal Circle of the Survey under the direction of G.T. Shende, assisted by Narayan Vyas, M.I. Peshwani, K.K. Rai and Rekha Radha Ballabhi carried out excavations at Wasvi, with a view to expose monolithic rock-cut temple on a hill slope on the bank of the Koram, a tributary of the Narmada.

The excavation brought to light an unfinished rock-cut temple facing east. The temple was exposed 6-5 m from *sikhara* downwards and the extant temple measures 12m east-west and 7-75 m north-south. The temple has on plan *mukha-mandapa, mandapa, antarala* and *pancharatha* sanctum. The *sikhara* portion is partly broken and it is decorated with *mithuna, kirtimukha* and *chaitya-arches*. In-between the *sikhara* and *mandapa* above the *antarala* is a rock-cut *sukanasika,* which has a deity in the front portion. The *varandika* portion is decorated with a series of miniature niches carved with *mithuna* couples. On the top of the *mandapa* are carved a lotus with a *kalasa* in the centre and four seated lions on all the cardinal directions. Out of the four lions one is seated on an elephant. At the centre of the porch *(mukha-mandapa)* there is an ornamental rock-cut seated elephant decorated with chain and bell designs.

On the basis of the style and architecture, the temple is datable to eighth-ninth century AD (pl. XXXII).

36. EXCAVATIONS IN THE CENTRAL NARMADA VALLEY, DISTRICT NARSINGHPUR.— Detailed explora tions and palaeontological excavations were carried out in the Central Narmada valley in the district Narsinghpur as part of the project "Taphonomy and Palaeoecology of the Central Narmada Valley, M.P.", sponsored by the Rashtriya Manav Sangrahalaya, Bhopal, under the direction of G.L. Badam assisted by Vijay Sathe of Deccan College, Postgraduate and Research Institute, Pune, and D.K. Jain of R.M.S., Bhopal and Seema Pawankar, research assistant of the project.

Initially the work was started in the vicinity of hominid site of Hathnora and extended to some of the localities at Surajkund and Dhansi. A number of vertebrate fossils were collected at these sites, notably being the tusk fragments, thoracic vertebra, lower and upper teeth and limb bones of *Elephas* sp. The stratigraphy of the hominid bearing section was re-examined and studied and a step trench was dug to check the stratigraphy of the unexposed alluvium. A few Acheulian, Middle Palaeolithic artefacts were also discovered in these areas.

In accordance to the field taphonomy and its relation to the fossil discoveries in the Narmada valley, freshly dead and a few days old carcasses of cows, exposed near the banks of the Narmada were -monitored for neotaphonomical modifications at Hathnora and Surajkund. The scattering pattern of the skeleton and behaviour of scavengers with respect to bone elements was closely monitored and some of the limb bones were buried at the banks of water pools for observing modifications brought out by fluvial activity, which will be removed after rainy season.

In view of the abundance of fairly preserved bones at Devakachar, the excavations were mainly concentrated in this locality. A pilot trench was excavated at Guraria ghat (opposite to the village Devakachar). The stratigraphy of this section was (from top to bottom) : black cotton soil (2.50 in), fissured clay (0.56 m), gravelly bed (1.40 m); which is divided into two, the upper one is devoid of molluscan shells (0.84 m) and the lower one is with several varieties of molluscan shells (0.56 m),

followed by 0-93 m cross bedded sandy band which yielded a complete skull and a rib of *Bos* sp., this was followed by reddish mottled clay (0.55 m), cross bedded sandy horizon (0.74 m) with black manganese bands, greyish sandy horizon (0.51 m) and mottled clay (2.17 m). In order to understand the complete litho-stratigraphy, three trial pits were taken at varying heights from the Sher river. The trial pit I, nearest to the pilot trench (2 X 2 X 1 .70 m), comprised from the base, mottled clay (85 cm thick to the left and 90 cm thick to the right) and covered by sub-recent alluvium with gravel, pebbles, and cobbles. Trial pit II (1 X l X 1.40 m) was dug on the slope at a depth of 1.16 m towards the Sher and 1-40 m towards the trial pit I. The lithology comprises of (from the top) sandy horizon followed by fissured clay, sandy bed, mottled clay at the bottom. Trial pit III was dug at the bank of S her (in the field) with the maximum depth of 1-3 m and the other side being 50 cm. Top unit is sub-recent alluvium of gravel (64 cm), followed by mottled clay (70 cm) touching the level of the Sher. On the whole, the pilot trenches yielded vertebrate fossils, molluscan shells, prehistoric artefacts and provided useful geomorphological and sedimentological data. The pattern of sedimentation is ununiform in the shallow stagnant water basin, followed by flash floods as evidenced by the grain size of sub-recent alluvium.

In addition to the previously made collections, a large number of skeletal and cranio-dental elements of *Elephas hysudricus, Elephas namadicus, Hexaprotodon* sp., *Bos namadicus, Bubalus palaeindicus, Antilope cervicapra, Equus* sp., *Crocodylus* sp. and *Trionyx* sp. were collected from these excavations and from explorations in the vicinity of Devakachar. However, one of the important discoveries of this season, and for the first time in the Peninsular India, is the first record of a microvertebrate community found in late Pleistocene sediments in the Narmada valley at Devakachar. The fossil remains were found concentrated in the top gravelly bed which is overlain by sub-recent yellow silt followed by black cotton soil. The findings comprise a partial skull, isolated teeth, incisors, limb bones, vertebrae, etc., referable to the genera *Golunda, Tatera, Nesokia, Rattus* and *Mus.* A few fish dentaries and crocodile teeth were also found from this gravelly horizon. Dry and wet sieving methods were employed to retrieve the micromammals from the sediments. Blocks of clay were removed from the potential litho units and were soaked in Kerosene for about two hours, followed by soaking them in water for an hour and later sieved in water right at the bank of river Sher. Rodents embedded in the clay got gradually separated from the clay and got exposed in the mesh of the sieve. Dry sieving was employed to the gravelly sand which also yielded a large number of incisors, limb bones and dentition of different rodent genera. They were catalogued and stored in small plastic jars for further preparation and study in the laboratory at the Deccan College.

The discovery of micromammals will help us throw precise light on the palaeoecology and chronology of the Narmada sediments, hitherto derived only on the basis of megavertebrates. The fossil remains of murids (rats and mice) are very rare and the present discovery has a great bearing on the taxonomic and phylogenetic reconstruction of the Pleistocene murids in general. So far the murid remains have been discovered only in the Upper Siwaliks of India and Pakistan and Karewas of Kashmir, dated from late Pliocene to Early Pleistocene. As regards the evolutionary relationships of these genera with their predecessors of Siwaliks of India and Pakistan, it is necessary to have numerically several complete specimens from different chronologically controlled geological strata.

Rodents are confined to specific habitats and have life span of relatively short duration with small home ranges. As a result, their occurrence, confined to one particular horizon (and being multispecies) indicate the areas of preference with respect to the local ecology of the area. The skeletal elements are in a fairly good state of preservation and their ratio clearly suggests that the bones have died at the spot of biocoene activity. On the whole this is the most important contribution of the field work carried out so far in the Central Narmada valley.

An interesting worked bone has been found in association with the fossil rodents in the top gravel bed at Devakachar. The upper part of the bone surface has been polished and two longitudinal chips have been removed, possibly in an attempt to make a chisel from the bone fragment. Texture and colour of the worked area suggest this to be a prefossilization activity. With this discovery the antiquity of bone tool making in India can be pushed back to the Upper Pleistocene period. So far the earliest report of bone tool making is known from the Kurnool Caves in Andhra Pradesh and dated to the Terminal Pleistocene.

At Devakachar a thin deposit of volcanic ash has been found within *non-in situ* gravel bed, about 5m up in the section. From similar horizon a good quantity of volcanic ash was also collected last year for dating. Radiometrically, the Quaternary sediments in Narmada valley have been dated to 31,750 yrs B P. However, this being the single date available for the exposed alluvium of the Narmada sequence, we need to substantiate it by more dates of different physical methods so that the alluvium is put in a proper chronological framework. Against this background, the absolute dating of the volcanic ash is important as it is expected to provide us with a definite geochronological record of Pleistocene sediments in Narmada. Volcanic ash has also been discovered at Bori (and dated to 1.2 my) in Kukdi river valley (District Pune, Maharashtra) and the Son valley in Madhya Pradesh and as a result it may become possible to date Quaternary sediments of the Peninsular India comprehensively.

It was possible to demarcate two different taphonomical regimes in the Narmada and its tributaries which are associated with two sedimentological histories, *viz.,* the basal sandy pebbly gravel and the overlying silty sandy and clayey horizon. Bones coming from the sandy pebbly gravel are abraded and depict considerable breakage patterns, which shows that the assemblage has covered long distances by means of fluvial transportation and hence is considered allochthonous in channel lag deposits. The vertebrate assemblage in the sandy pebbly gravel at Narmada is generally represented by poorly preserved, disarticulated, fragmented bones which have been apparently transported before and after burial. However, the bones from the overlying fine sandy silty clay are better sorted, often complete in channel fill deposits. These are considered autochthonous with respect :o local channels. The concentration of fossils is mostly confined to Devakachar and its vicinity. This has initiated a detailed inquiry into the factors which were responsible for this phenomenon. It is possible that in the Narmada, summer storms followed by flash floods (and seasonally occurring floods) may have created panic resulting in the mass deaths of animals, which were subsequently buried and became fossilized. Field observations have shown that the pattern of sedimentation is ununiform in the shallow stagnant water basins, followed by flash floods as evidenced by the grain size of sub-recent alluvium. However, the study on the fluvial processes, atmospheric conditions and the rate and mode of transportation is under way which are expected to throw a great deal of light on the actual provenance of fossil assemblages.

There are a number of taphonomic attributes, e.g., weathering, abrasion, different types of breakages, flaking, scavenging and bacterial activity etc., which have been identified in the collection of fossils. These attributes cover an entire life history of a fossil and must have been subjected to localized biological and physical stresses, which were ultimately responsible for the preservation and/or destruction of death assemblages throughout their individual taphonomic history. Important palaeoecological information given above has become available because of a multi-disciplinary study of the Narmada alluvium.

A few more step trenches were dug in the section of small *nullahs* to compare the stratigraphic details. Numerous molluscan shells, a few mega and micro vertebrates and Stone Age tools (Middle-Upper Palaeolithic) were collected from these areas. Several soil samples were also collected for analysis to understand the nature of soils and its genesis in the area.

Several elephant bones were found from the gravel deposits at Belghat. At Umaria two *in-situ* mandibles of Hippopotamus were excavated from hard clay band of 30 m thickness of a road cutting on a 15 km stretch from Umaria to Dhunwadhar. Exploration was conducted in other areas like Ratikarar, Jhansi ghat, Talaya ghat, Guari ghat, Barman ghat, Bheda ghat (Jabalpur), Suri ghat, Pawla, etc., and several fossils, stone age tools, molluscan shells and the relevant geological data was collected.

A large number of molluscan shells of Lamellibranchs and Gastropods found associated with gravelly horizons indicate fresh water deposition of the sediments and may give better clues to the chronology and palaeoecology of the Narmada sediments.

The recent field work has also yielded a large number of Stone Age and Mesolithic tools from stratified context and sometimes in association with fossils, from the top of gravel beds in proximity to main channels of Narmada and its tributaries. Typologically, the tools can be classified into different types of flakes, scrapers, cores, blades, points, chips, etc., belonging to the Middle and Upper Palaeolithic and Mesolithic periods respectively.

37. EXCAVATIONS AT MAIHAR, DISTRICT SATNA.—The Department of Ancient History, Culture and Archaeology, University of Allahabad, resumed excavations at lower Palaeolithic open-air site at Maihar (24° 16' N; 88° 46' E) in district Satna. The excavation was conducted by J.N. Pandey, J.N. Pal, D.K. Shukla and M.C. Gupta with the assistance of H. N. Kar, L.K. Tewari, Rajendra Prasad, V.K. Khatri and Arvind Malviya.

The Acheulian locality of Maihar I already excavated between 1987 and 1988, was taken up for further excavations. Maihar I had been grided into 1 m by 1 m squares for excavation purpose in 1987. Three trenches, each measuring 5 X 5 m were laid in the grided area for the excavation. One trench was located in south-west corner in squares A-7 to A-11, B-7 to B-11, C-7 to C-11, D-7 to D-11 and E-7 to E-11. The excavation in this trench was conducted upto a depth of 48 cm. The total deposit was divisible into 3 layers. Layer (3) with a thickness of 25 cm yielded Acheulian artefacts, in primary contexts. The excavation exposed fresh artefacts, big and small flakes and slightly weathered stone blocks. The artefacts recovered from excavation include handaxes, cleavers, scrapers, polyhedron and discoids in addition to utilized flakes.

Another trench measuring 5x5 m was laid in the north-west corner of the grided area in squares S-7 to S-l 1, T-7 to T-l 1, U-7 to U-l 1, V-7 to V-l 1 and W-7 to W-l 1. The excavation was conducted upto a depth of 25 cm. The deposit was divisible into three layers, most of the layers 1 and 2 were washed away, the artefact bearing deposit of layer (3) was present in all the squares of the trench. The trench yielded lower palaeolithic artefacts consisting of handaxes, cleavers, scrapers and flakes. Rounded boulders with pitted surface, possibly used as anvils, were also recovered from this trench. A few boulders with flake-scars were other noteworthy finds.

The third trench measuring 5x5 m in squares S-13 to S-17, T-13 to T-17, U-13 to U-17, V-13 to V-17 and W-13 to W-17 was laid in northwestern part of the grided area and the total deposit measuring 30 cm (pl. XXXIII A) was exposed in the trench as a result of excavation. The deposit was divisible into three layers of varying thickness. The layer (3) with an average thickness of 20 cm yielded Acheulian artefacts in primary context (pl. XXXIII B). The lower palaeolithic assemblage consists of cleavers, scrapers, handaxes, discoids, fashioned on quartzite, besides, cores and flakes . The layer (3) was littered with small flakes and chips. Squares A-l to A-5, B-l to B-5, C-l to C-5, D-l to D-5 and E-l to E-5 located in the southwestern portion of the grided area and excavated during 1988 upto a depth of 89 cm were taken up for further deep digging during the current season in order to check whether any artefact bearing deposit is lying below layer (3). The digging was done upto a depth of 15 to 20 cm in various squares.

A contour plan of Maihar I was prepared in order to understand the topography of the site, which indicates the gentle slope from south-west to north-east, from Maihar Hill towards the Lilji river.

38. EXPLORATIONS IN TONS AND SON VALLEYS, DISTRICTS SATNA AND SIDHI.— V.D. Mishra, B.B. Misra J.N. Pandey, J.N Pal, U.C. Chattopadhyay, Prakash Sinha and D.K. Shukla of the Department of Ancient History, Culture and Archaeology, University of Allahabad carried out explorations in Tons and Son valleys of the Vindhyas and in the Gangetic plain. Following sites were discovered.

An Acheulian site was located in Jhukehi near the source of the Tons in Satna district. The site is quite extensive and the artefacts are mostly exposed and lying on the present surface. The artefacts consisting of cores, flakes, cleavers, handaxes and scrapers were collected from the rain gullies and are considerably abraded and patinated.

A primary Middle Palaeolithic site was discovered towards south of Sihawal village in district Sidhi. The most important discovery of the season's exploration in the Son valley was that of plant fossils (leaves) from the concretionary horizon in the upper member of the Patpara formation in Patpara locality near village Baliar in Sidhi district. Fresh Middle Palaeolithic tools, mostly fashioned on cherty stuff, were extracted from this formation alongwith the plant fossils.

A site of Upper Palaeolithic culture was also located in Patpara locality near Baliar village.

39. EXCAVATION AT BANKI, DISTRICT SIDHI.—The Mesolithic occupation site of Banki (24° 35' 10" N; 82° 14' 50" E) located on the left bank of Kundheri Nala, a palaeochannel of the river Son, at the southern foot of the Kaimur range in Sihawal Tehsil of Sidhi district - about 2 km north of the Sihawal township was taken up for excavation by the Department of Ancient History, Culture and Archaeology, University of Allahabad. The site is a low profile mound, generally irregular oblong on plan - longer

and shorter axis of which measure 114 m (north to south) and 103 m (east to west), respectively-with the maximum height of about 2 m above the surrounding walking surface. The entire surface of the site is littered with a large number of sandstone rubbles generally with angular sides, raw materials in the form of fresh nodules of chert, chalcedony, agate, jasper, carnelian, etc., of different sizes, circular discs, stone balls, anvils, hammer stones often with bruised pitted surface, ring stones, giant querns, mullers, retouchers and microlithic artefacts in different stages of manufacture. A substantial part of the site towards the western side is scrapped off and levelled by the landowner for cultivation.

The site, first discovered during the course of an exploration in 1982-83 by the Department was taken up for a small-scale excavation in 1983 with the purpose of ascertaining "the total deposit and the underlying geological formation". The excavation of a step trench on the western margin upto a depth of 1-80 m was rewarding in terms of forming a general idea about the microlithic artefacts in their stratigraphic context and their relationship with other excavated Mesolithic sites like Baghor II and Medhauli I of this region.

During the period under review, a small area near the abraded western fringe of the site was taken up for excavation with a view to ascertaining the thickness of occupational deposits and stratigraphy on the one hand, and the salient features of the archaeological culture (s) on the other. The slope of the selected spot was generally from north-east to south-west. A 5 X 5 m grid was laid out immediately east of the abraded margin at the western side of the site. Simultaneously, l X l m test trench was dug (upto a depth of 1.17 m) immediately to the north of the said grid in order to determine the stratigraphic sequence of the occupational layers.

A test trench sunk to a depth of 1.17 m into the upper fine member of the Baghor formation was divisible into 5 layers. No major unconfirmity was noticed and the change, particularly in the lower levels, is a gradual one as is consistent with these deposits belonging to the fine grained upper member of the Baghor Formation and datable to the close of the Pleistocene period *circa.* 10,000 BP.

Layer 1 with an average thickness of 15 cm consists of light brown loam. The upper half of this layer was disturbed due to recent cultivation. Microlithic artefacts in the form of worked nodules, finished tools, wastes, etc., were recovered from this horizon. The subsequent level, composed of yellow-brown loam, was divided into two sub-units: 2A and 2B, with average thickness of 17 cm and 11 cm, respectively. Microlithic tools recovered from these sub-units include various types of blades, triangles, lunates, etc. The raw materials used for these tools include chalcedony, chert, agate, jasper, carnelian and quartz. Layer 3 consists of greyish white clay and measures 13 cm in thickness. Although the tools from this layer were of microlithic dimension, a marginal increase in their size was noticed. Layer (4) was a 52 cm thick deposit of black clay. The tools recovered from this layer were largest in the series, and compare well with the terminal Upper Palaeolithic tools from Baghor III. Layer 5, the last in the stratigraphic series, consists of yellow-grey loam and belongs to the upper fine member of the Baghor formation.

The excavation in the main trench was suspended at a depth of 43 cm after exposing two successive occupational floors, 2A and 2B. Sandstone rubbles, querns, mullers, raw materials, microlithic

artefacts, etc., were found distributed in high and low density scatters on these occupational floors. Clusters of high concentration are found in northwestern and southeastern parts of the grid and in much of the area east of the baulk on the occupational floor of 2A, whereas in the case of occupational floor of 2B, clusters of high concentration were noticed in the northern and southern parts of the grid and in much of the area east of the baulk. Besides these clusters, there were noticed on both the occupational floors number of small circular sandstone pavements (probably bases of storage bins), mostly in the eastern side of the grid. The diameter of these pavements varies from 0.5 m to 1.0 m.

A distinguishing feature of the two high concentration zones on the floor level of 2 B is the presence of a number of post-holes along the peripheries. The deposition of the post-holes suggests that the structures (huts) were either semicircular or oblong/circular as is the pattern observed at other Mesolithic sites of the Vindhyas: Chopani-Mando in the Belan valley and Baghor II in the Son valley, for example. Within the said high concentration zones on both the occupational floor levels were found many discrete clusters of rubbles, querns, hammerstones, anvils, raw materials, microlithic artefacts, etc. These discrete clusters represent, in all probability tool-manufacturing and food manufacturing processing activities. The presence of such a large number of rubbles of varying size and shape on the floor levels suggests that these rubbles served an important purpose to the occupants of the site. The rubble concentrations enclosed by a number of post-holes at regular intervals show that the occupants typically made use of large number of stone rubbles in shelters: possibly these stones served as paving stones or, more likely, as sleeping or storage platforms, head-rests, etc., as is practised by the contemporary Nomads in the Vindhyas. Again, by the same modern analogy, it seems highly probable that these rubbles were brought to the site by the Mesolithic occupants from the adjacent Kaimur hills.

On technological evidence, the site appears to be first of its kind in the entire Son valley at least in showing intrasite evolution of the microlithic tradition (Mesolithic) from the terminal Upper Palaeolithic tradition. The analyses of limited samples from the test trench as well as the main trench show some interesting evolutionary patterns. The tools from the lowest artefact bearing layer, i.e. 4, comprise mainly blades of several sub-types, such as parallel- sided, blunted, backed, retouched, etc. Fashioned mainly on black grey chert, these tools are larger and broader than those found from subsequent layers. Artefacts from layer (4), as also their raw materials - mainly chert (77.5%), but also chalcedony, agate, etc. (22.5%), -compare well with those from the terminal Upper Palaeolithic site of Baghor III. The assemblage from the succeeding layer (3) includes, among others, broad blades, blunted backed blades and retouched blades, as also blanks, flakes and wastes. Although the proportion of raw material (chert vs. non-chert) shows no significant change from that in the preceeding layer, the overall tool size indicates a marginal reduction in layer (3). The assemblage from layer (2) with sub-units B and A consists of tools like blades (retouched, blunted backed notched and truncated), triangles, and percoir lunates.

Layenvise raw material composition based on selected samples from Banki.

Layer/Sub-layer	*Chert*		*Non-Chert*		
	Number	*%*	*Number*	*%*	*Total*
1 (disturbed)	32	26.0	91	74.0	123
2A	70	11.4	543	88.6	613
2B	93	20.5	360	79.5	453
3	95	77.9	27	22.1	122
4	345	77.5	100	22.5	445
				Total	1756

Note : Chen includes 3 varieties; black grey (predominant), white and blue/green; Non-chert includes chalcedony (predominant), agate, jasper, carnelian and quartz.

The unmodified types include blades, flakes, blade/blade-flake fragments, chunks and cores, both amorphous and fluted types. Strangely enough, trapeze was conspicuous by its absence in these sub-layers, and for that matter, in all the layers. From sub-layer (2A) was recovered what could be described as a proto-tranchet or technical tranchet. The assemblage from layer (2) on the whole represents a typical early (aceramic) Mesolithic industry, such as that reported from Baghor II and Medhauli I. The tools show gradual size reduction from layer (4) to (2A) through (3) and (2B). A change in the proportion of certain raw materials is also evident. For example, chert, which predominated earlier assemblages, shows successive proportionate decrease with the corresponding rise in the proportion of non-chert materials (22-1 % in layer (3), 79-5% in (2B) and 88-6% in (2A). Another important feature of tools from all the layers is the evidence of heat treatment on few of them. Although the tools from the topmost layer (1) are similar to those noted for layer (2A), there is evidence of further size reduction. Since layer (1) was disturbed due to recent human activities it is not safe to draw any conclusion either on its tool technology or raw material composition.

The results of this excavation were useful not only in exposing two successive occupational floor levels and high concentration zones demarcated by post-holes (floor 2B) during the Mesolithic period, but also in suggesting a pattern of decrease in both tool size and use of chert as one proceeds from layer (4) (terminal Upper Palaeolithic) to layer (2A) (Mesolithic).

MAHARASHTRA

40. EXPLORATION IN DISTRICT AHMEDNAGAR.—In course of village-to-village survey in Sangamner taluk/tehsil Ajit Kumar of Aurangabad Circle of the Survey noticed the following antiquarian remains:

TaluklTehsil	*Village!Site*	*Nature of remains*
Sangamner	Aurangpur	Mound, pottery and microliths, etc.
—do—	Chinchpur	Temple and inscription of eighteenth - nineteenth century AD and an image of Nandi

TaluklTehsil	*Village/Site*	*Nature of remains*
Sangamner	Kondu	Fortification, gateway and Bavadi (?) of eighteenth-nineteenth century AD
-do-	Mandu	Pottery and microliths, etc.
-do-	Nimbgaon	Fortification and gateway of eighteenth-nineteenth century AD
-do-	Wadgaon-Pan	Temple and inscription in Modi script dated Saka era 1695, i.e. AD 1773

41. EXPLORATION IN DISTRICT AHMEDNAGAR.—In the course of exploration of the submergence area of Tajanapur lift Irrigation Project, Pathardi, D.N. Sinha of Aurangabad Circle of the Survey noticed the following antiquarian remains:

TaluklTehsil	*Village/Site*	*Nature of remains*
Pathardi	Hanuman-Takli	A *sunnud* in Roman as well as Modi script (10-1-1876) issued on behalf of the Secretary of State in Council by the order of the Governor in Council of Bombay by and under the hand and seal of Alienation Settlement officer The *sunnud* continued the *Inam* (of Rs. a per annum) granted to the Maruti temple by the former (British) Government
-do-	Jawakhed-Dumala	Deepamal of late medieval period
-do-	Jawakheda-Khalsa	Mud bastion of late medieval period, Hemadpanti Barav of thirteenth century AD and *sunnud* of nineteenth century AD in Modi script with drawings on its leather cover
-do-	Kopre	A medieval site yielding pottery, terracotta bead and stone dabber
-do-	Kasar-Pimpalgaon	Medieval pottery

42. EXPLORATIONS IN DISTRICT BEED.— In the course of village-to-village survey in Georai tehsil/ taluk, S.L. Jadhav of Aurangabad Circle of the Survey noticed the following antiquarian remains:

Village/Site	*Nature of remains*
Antarwadi (Bj)	Stone pillar with images at the base and medieval pottery
Bhojagaon	Sculpture of Mahishasuramardini of late medieval period
Chopdya-Chiwadi	Early historic pottery, stone ovalish *dawhar*

Village/Site	*Nature of remains*
Daithan	Sculpture of Vishnu
Dhumegaon	Hero-stones
Golegaon	Natural rock-shelter
Hiwarwadi	Late medieval pottery
Jategaon	Manuscript of Dhyaneshwari, Rukmini Svayamvar and Tukaram *Gathas,* etc.
Kathoda	Three ruined Hemadpanti temples, one with damaged sculpture of Vishnu and medieval pottery
Katchincholi	Sculpture of Ganesa and medieval glass bangles, etc.
Lukhamasta	Sculpture of Krishna in black stone
Patherwadi	Early historic pottery and terracotta fragmentary human head
Rajapur	*Ghat,* temple of Siva of late medieval period
Rampuri	Two late medieval temples of Siva
Surdi-Buzurg	Sculpture of goddess probably Durga

43. EXPLORATION IN DISTRICT BHANDARA.—A.K. Sharma, assisted by N.G. Nikosey, Ghayasuddin and P.C. Dogra of the Prehistory Branch of the Survey, discovered two caves on the eastern face of a hill known as Chaprar Pahadi (20° 43' N; 79° 53' E), nearly 4 km south-east of tehsil town Lakhandur. Though these caves are found to be barren, occurrence of microliths on the hill top suggest that they might have been used for seasonal occupation by the Stone Age people.

44. EXPLORATION IN DISTRICT CHANDRAPUR.— Amarendra Nath assisted by N.C. Prakash, Ch. Babjirao, N.K.S. Sharma, S.K. Gulrandhe and H.J. Barapatre of Excavation Branch I of the Survey, Nagpur noticed a microlithic site at Ghugus, taluk Chandrapur where open cast mining of coal is going on continuously since the beginning of the present century which has completely denuded some of the important archaeological relics from the site. An extensive open air factory site under destruction was located towards the southwestern slope of the outcrop overlooking Wardha river. Located in an ideal geomorphological surroundings, the site revealed a variety of tool types which consisted of blade, point, scraper, etc., prepared on chert, chalcedony, agate and jasper. On the eastern slope of the outcrop, close to the present day habitation, an early historical mound, nearly a metre high, was also noticed. The site yielded red-slipped, micaceous red, black and dull black wares which included shapes like vases, jars, carinated *handi,* bowls and platters of medium to coarse fabric.

At the outskirts of village Ghonar, another early historical site was noticed. The potsherds picked up from the site included red-slipped, micaceous red and black wares, the shapes met with were jars, bowls, carinated *handi,* platter, etc., all of medium to coarse fabric. Stone objects included muller, skin rubber, hopscotch, etc., while copper objects comprised of a circular coin, finger and toe rings.

At Mursa, taluk Bhadravati a Siva temple of *circa* twelfth century AD was noticed, situated on the Bhadravati-Ghugus State Road. The temple is built over a high *jagati* consisted of *garbha-griha, antarala* and *mandapa* on plan. The temple seems to have been restored in stages during the medieval and late medieval times. The architectural vestiges in the form of floral and geometric patterns of the earlier period can be noticed in the *adhishthana* portion of the temple. Among the loose sculptures at the site, a torso of Ganesa and fragment of an elephant, both of red sandstone, deserve special mention.

45. EXCAVATION AT ADAM, DISTRICT NAGPUR.— In continuation of the last three season's work *{1990-91,* pp. 45-50), the Excavation Branch I of the Survey, Nagpur under the direction of Amarendra Nath assisted by S.N. Raghunath, N.C. Prakash, S. Pratapchandran, Ch. Babjirao, N.K.S. Sharma, S.V. Sutaone, P.M. Bhope, S.K. Gulrandhe, H.J. Barapatre, D.K. Kasbi, D.S. Shambharkar, A.U. Ganar, S.M. Khairkar, Shahid Akhtar, Sultan Singh and Indira Tiwari resumed excavation at Adam (21° 00' N; 79° 27' E) with a view to (i) re-confirming the various phases of restoration in the rampart and its stratigraphic co-relation with the inner habitation, (ii) re-ascertaining the nature and extant of the rampart of Period HI, (iii) determining the various phases in Period V on the basis of numismatic evidence, and (iv) collecting further data on the settlement-pattern of Period V by way of exposing more structural complexes within the rampart.

In view of the above, the following trenches were subjected to excavations - A7, A8, B7, B8, C7, D7, E7 to E9, F7 to F10, F16, F17, G7 to G10, G16, G17, H16 to H22 and T5.

The chronology as reported earlier, remained unchanged, however, Period V could further be classified into three phases on the basis of frequency of coins, *viz.,* Period VA: Bhadra, Period VB: Satavahana and Period VC: Maharathi (fig. 11).

In order to achieve the first objective, quadrant 1 and 4 of H16 to H22 were opened across the southern rampart, connecting the exterior moat with that of the habitation inside (pl. XXXIV A). In H16, Qd 1 the digging was confined upto layer (4) while in H 16/4 to HI8/4 digging was restricted to layer (8) only. Layer (6) sticking against the rampart yielded NBP ware while layer (5) yielded inscribed Bhadra coins issued by Dambhadra and Satyabhadra. The maximum height of the rampart recorded was 3.60 m and the width 27 m.

On the top of layers (7) and (8) number of structural activities of Period IV were noticed in the form of floors, post-holes and hearths. A portion of two circular floors was exposed, one had layers of compact fragmentary tile-flooring and other *murrum* (pl. XXXV A); both *h?* J a series of post-holes along their circumferences. Besides, thick jar fragments with applique bands w< re also used in building a compact floor; incidentally, this floor was used by a bead maker as it yielded a few finished and unfinished beads. Abutting to this floor, a metre long but narrow hearth was also noticed. The other hearths noted from this level were of simple U-shape, some had segmented fire chamber (pl. XXXVB). Further, in HI8, Qd 1 and 4, an extensive lime finished mud floor was noticed with a slope towards west and platform like elevation towards east, next to it there was an iron point embedded in the floor. The post-holes occurring on these floors suggest a kind of rectangular structure with compartments. Another interesting feature noted here was the unit of three post-holes each at a distance of 35 cm which supported a wooden plank possibly to serve as an improvised bench; the perished remains of the said plank was noticed extended between the post-holes over the floors.

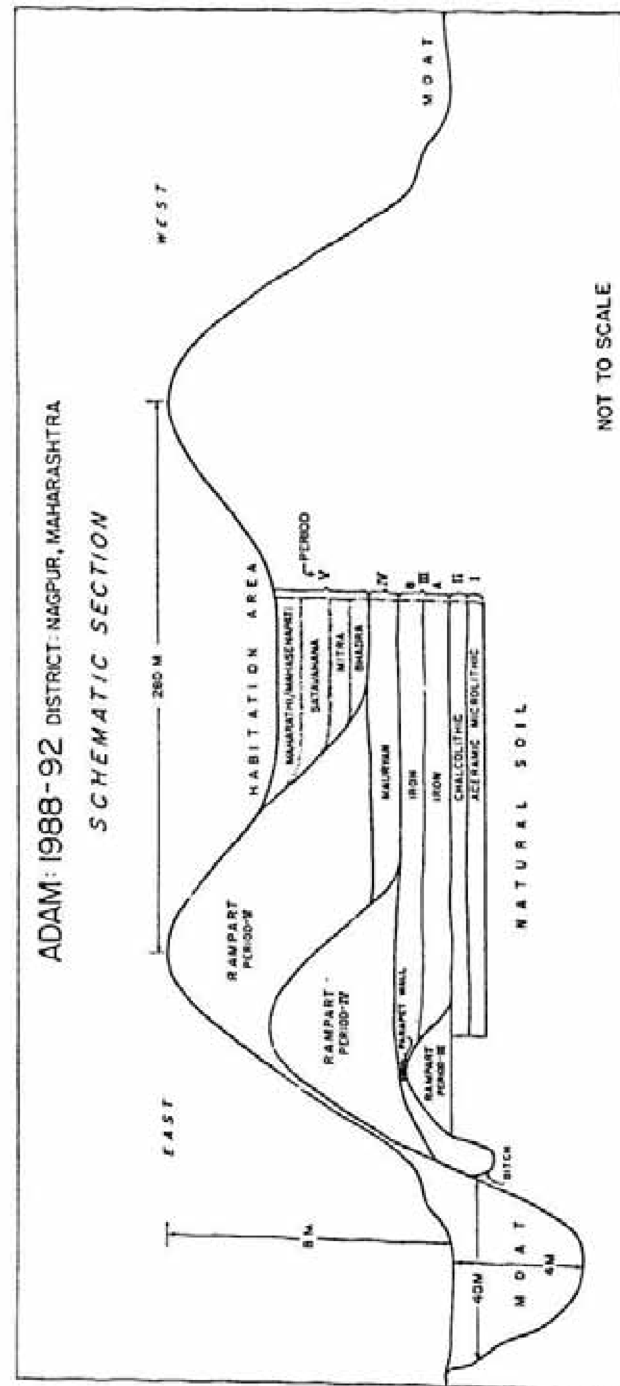

ADAM: 1988-92 DISTRICT: NAGPUR, MAHARASHTRA
SCHEMATIC SECTION
EAST
WEST
260 M
HABITATION AREA
MAHARATHI/MAHASENAPATI
SATAVAHANA
MITRA
BHADRA
MAURYAN
IRON
IRON
CHALCOLITHIC
ACERAMIC MICROLITHIC
NATURAL SOIL
RAMPART
RAMPART
PARAPET WALL
RAMPART
DITCH
MOAT
MOAT
NOT TO SCALE

FIG. 11

Another rampart cutting (T5, Qd 1 and 4) on the eastern flank in which the natural soil could be touched reconfirmed the chronology of the site arrived at earlier seasons. The most important disclosure in a stratified context was that of the earliest rampart at the site assigned to Period III (pl. XXXIV B). The rampart wall running north-south was exposed at a stretch upto ten metres showing on an average height of 1-40 m and width 7 m. Built out of yellow *murrain* and earth, it rested over layer (15) which yielded iron slags and sherds of Black-and-red, black-on-red and other wares as noted earlier from this horizon. The other contemporary layers sticking against the rampart of Period III were layers (14), (13) and (12). It seems that during the early phase of Period IV when the rampart got camouflaged by the deposits of Period III, a parapet wall in dry random rubble masonry of three courses was built over it in order to gain the expression of a fortification. The wall was exposed horizontally upto ten metres showing a height of 40 cm and width of 1 m.

With a view to obtain more structural details of Period V, trenches were laid in the habitation area which brought to light some new house-types, besides the usual elliptical structures, ring-wells and a group of circular platforms. A mud floor (HI 6, Qd 4) sealed by layer (4) brought to light four hearths, a terracotta mother goddess, finished and unfinished stone beads and copper cast coins attributed to a Bhadra ruler of Vidarbha. Structures with vocational activities were also noted from this period, two of them were recognised as bead-maker's houses, out of which one was located in HI6, Qd 1. It was rectangular on plan, consisted of a cell and open verandah which yielded two stone blocks one bearing grooves formed due to constant rubbing of beads and other had glossy finished surface. A few finished and unfinished semiprecious stone beads were also picked up from the floor close to those blocks. Other bead-maker's house was located in F 7. It was elliptical on plan with three compartments; the central one had the main entrance in which the flanking ones distributed on the either side of the apse, were opening. Artefacts like bead polisher, beads and its raw materials were also recovered from the floor of the house. A red ware basin perhaps used as furnace-chamber containing ash and charcoal was noticed *in situ* against the partition wall of the central compartment (pi. XXXVI A). At a later stage four circular platforms and a tank were built, distorting the ground plan of the ellipitcal structure (fig. 12).

F 8, F 9, F 10 and G 9 revealed a structural complex which included a tile paved courtyard with U-shaped and *murrum* lined *chulhas,* a three-roomed structure (8.7 X 6m) with rooms opening in the corridor, and behind it a shale stone pavement, yielding horse's outfits like iron stirrup, horse-shoe and rings, purporting its use as stable (fig. 13). On the southern side of the three-roomed structure a terracotta ring-well was noticed encompassed with a burnt-brick platform *(jagati)* made in recessed order. The bricks used were near semi-circular or wedge-shaped (36 X 20 X 8 cm) variety (pl. XXXVI B). Another structure (14.7 X 8.2 m) of complex nature, in A7 and B7, had segmented corridors on either side of the longer axis with cells in-between, of varying dimensions, a portion of it had tiled floor. The purpose of some of the tiny cells remains enigmatic. The burnt-bricks were laid over the courses of random rubble. The two types of bricks were used in different sizes, i.e., 50 X 28 X 7 cm and 40 X 28 X 7 cm. Similar features were noticed in other structures too. In E9, Qd 4 northern portion of an elliptical structure was exposed which showed usage of wedge-shaped burnt-bricks (58 X 35 X 8 cm) in the construction of apse. In D8, Qd3 and E8, Qd4 a rectangular structure oriented east-west also had burnt

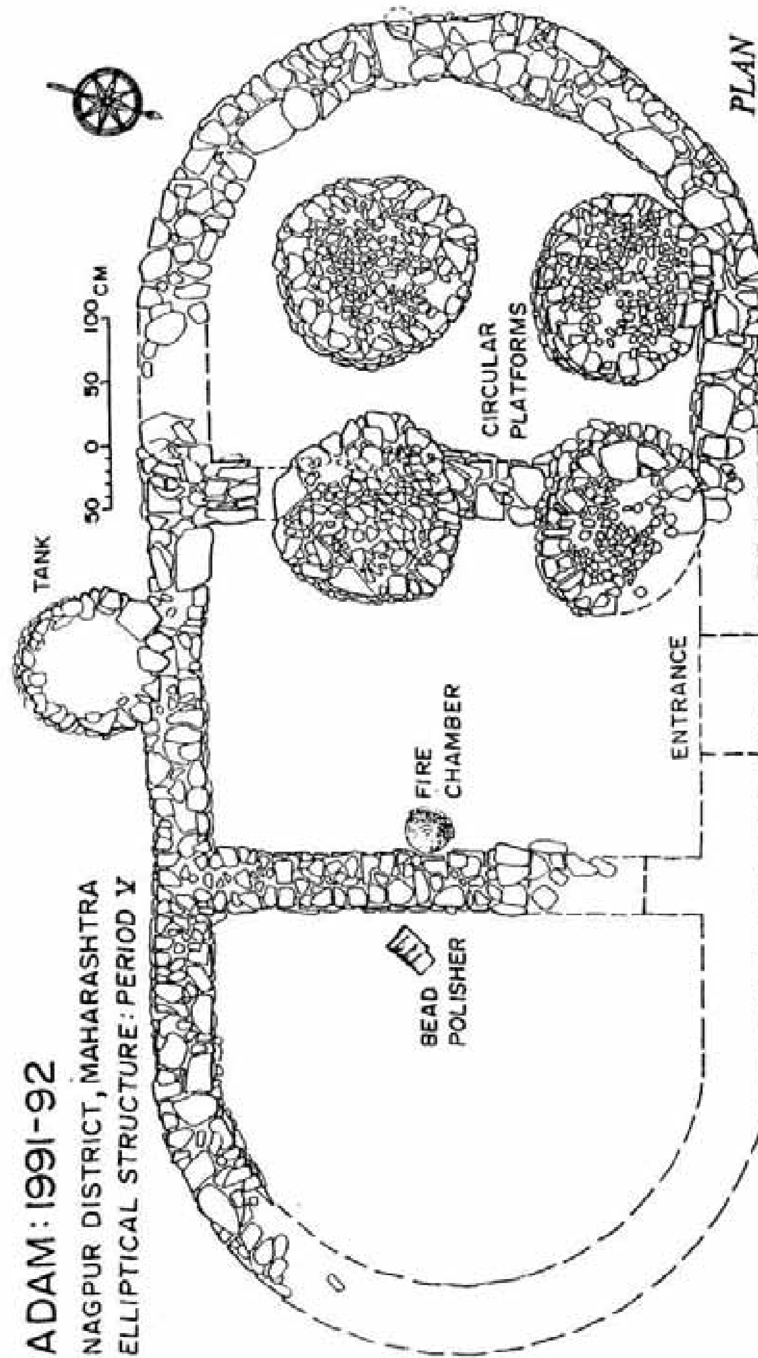

ADAM : 1991-92
NAGPUR DISTRICT, MAHARASHTRA
ELLIPTICAL STRUCTURE: PERIOD V
TANK
50 0 50 100 CM
CIRCULAR PLATFORMS
FIRE CHAMBER
ENTRANCE
BEAD POLISHER
PLAN

Fig. 12

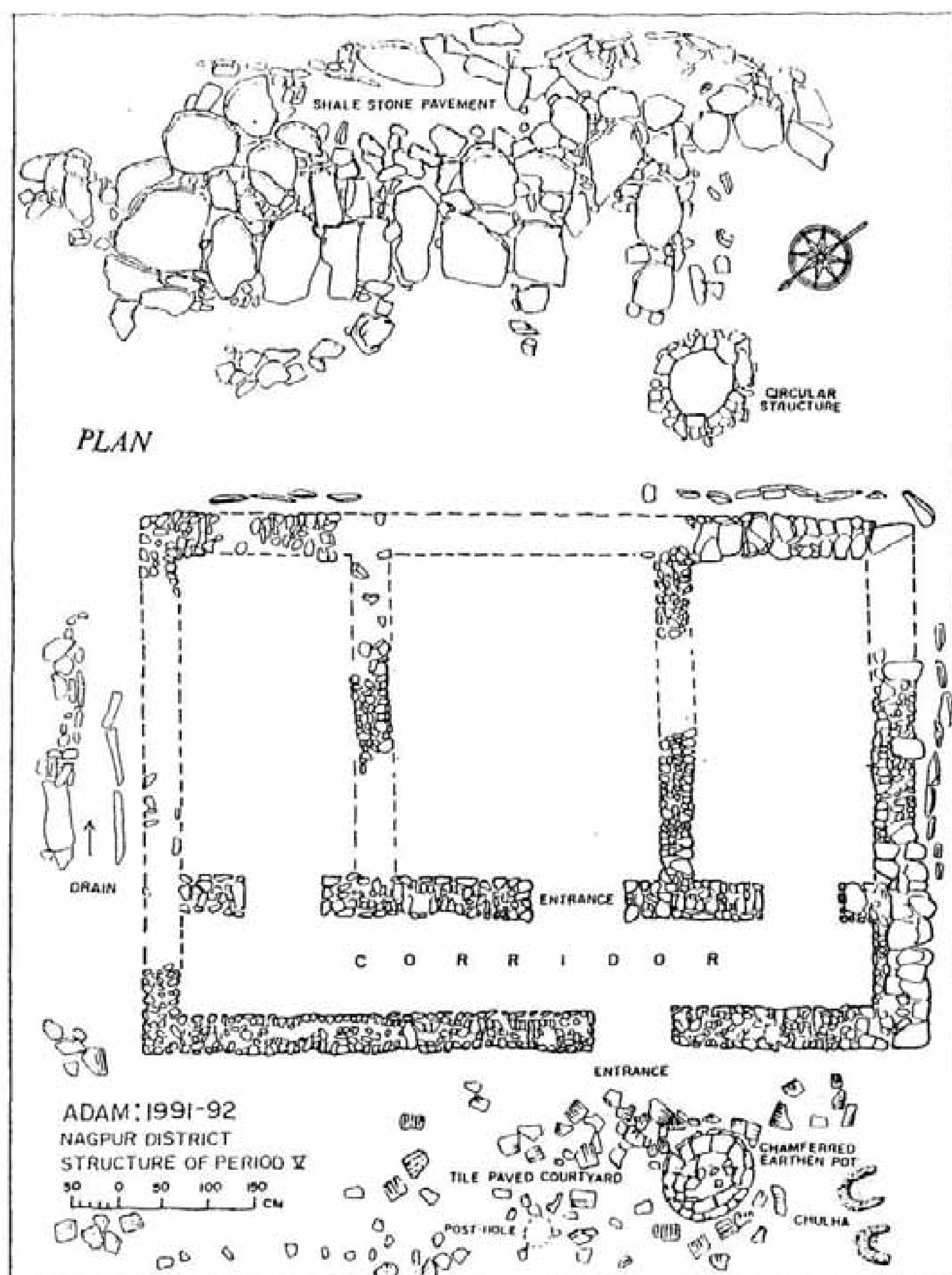

SHALE STONE PAVEMENT
CIRCULAR STRUCTURE
PLAN
DRAIN
ENTRANCE
C O R R I D O R
ENTRANCE
ADAM: 1991-92
NAGPUR DISTRICT
STRUCTURE OF PERIOD V
50 0 50 100 150 CM
TILE PAVED COURTYARD
CHAMFERRED EARTHEN POT
CHULHA
POST-HOLE

FIG. 13

bricks laying over the courses of random rubble in mud mortar. It had a cell on the western side followed by a verandah with covered sides and open front. The bricks used on an average was of 46 X 26 X 7 cm in size.

The most significant discoveries of the year were the cast coins of Taxila (pi. XXXVII A), terracotta portrait coin-mould (pl. XXXVIIB), a hoard of seventy-five terracotta uninscribed sealing bearing the device of a *bhadrapeetha* of an hour-glass shape (pi. XXXVII C), an inscribed sealing bearing legend : *Adikum (a) (ra) sutasa* (-) *ta karaterasa* ... *yajenamukha* (pl. XXXVII D), a fragmentary bone-comb carved with *mithuna* figures (pl. XXXVIII A) and a Roman silver coin (pl. XXXVIII B), all attributed to the various phases of Period V. Other antiquities included stone fragment of a *yaksha* head (pl. XXXIX A), terracotta figurines (pl. XXXVIII C), beads, votive tanks, spindlewhorls, etc., precious, semiprecious and other stone beads and ear-studs (pl. XXXIX B), bead polishers, querns, mullers and moulds (pl. XXXIX C), iron implements, spearhead, arrowhead, sickle, hoe, stirrup, horse-shoe, etc. A few tiny gold ornaments were also recovered.

The C14 dates obtained from the Chalcolithic (Period II) and Iron Age (Period III) horizons are analogous to other central and western Deccan sites. After calibration the date of Period II ranges between *circa* 1500 to 1050 BC, likewise the calibration date of Period III ranges between *circa* 1225 to 850 BC.

46. EXCAVATION AT SHIRKANDA, DISTRICT NAGPUR.— The Department of Ancient Indian History, Culture and Archaeology, Nagpur University, under the direction of Ajay Mitra Shastri, assisted by Chandrashekhar Gupta and Ismail Kellellu, Chandraprakash Saharkar, Tashkand Alone and Gajanan Katade, carried out trial excavation on an extensive protohistoric site just about 100 m south-east of the hamlet Shirkanda situated on the left bank of the river Sur, a tributory of the Wainganga, and about 75 km north-east of Nagpur and recovered a series of well-made floor levels with post-holes, kilns/ furnaces, pottery and a few other minor antiquities. All these point to the site being continuously occupied for a considerable time during Chalcolithic-Megalithic periods.

A 10 x 10 m trench laid on the topmost spot (about 7 m high from the water level of the river) yielded in all the quadrants evidence of human activity in the form of floor levels, post-holes, kilns/ furnaces, pits, pottery and other minor antiquities. A rammed floor with post-holes encountered in Qd I at a depth of 30 cm is noteworthy. Two pits within this circular hut yielded potsherds, animal bones and broken hopscotches suggesting their use as waste pits. The floors were prepared with earth mixed with lime laid and rammed on the soling of black-cotton soil. A horse-shoe shaped hearth containing ash and a few small potsherds on the eastern side within the hut is another interesting find.

Quadrant II revealed an east-west oriented oval pit just below the humus. It was found to have contained the hopper (top portion) of a terracotta rotary quern. The pit also yielded ash and potsherds. A fragment of a cream-slipped bowl with horizontal spout just below the rim is another interesting find from this quadrant.

Excavtions in Qd III and IV revealed very interesting structures that may as well as be kilns of furnaces. The one in the southwestern corner of Qd III with an east-west orientation contained three inter-connected depressions bounded with clay walls/ridges which showed thoroughly burnt marks.

Iron slag and ash was recovered from this structure. The second structure found in Qd IV had a well-defined raised ridge with four openings to the east. The third structure was a circular hearth-like one with about 10 cm thick burnt clay ridge on all sides except on the east. It also yielded ash and a small iron chisel-like object found lying on the right side of the opening. The slag and iron object, thoroughly burnt patches and lots of ash suggest their probable use as smelting furnaces. Thus, these three structures can be said to be the second evidence, the one at Naikund in the same district being the first one, for iron smelting furnaces in Maharashtra.

A 2 X 2 m cutting was taken in the northwestern corner of Qd I in order to know the cultural sequence of the site. The excavated 2.8 m thick deposit revealed about six distinct floor levels. All the floor levels were of comparable makeup - black-cotton soil soling (wherever the levelling was done) with rammed earth and lime mix on the top. In all the cases, where post-holes were found in association with floors, circular or ovalish plans could be seen.

A variety of pottery was recovered from the dig. It included Black-and-red, micaceous red, red in different shades, cream and black in dull and bright shades, wares with both slipped and unslipped varieties. Most of the red and cream wares show varieties of linear and geometrical designs done in black, violet and white on slipped external and/or internal surfaces (figs. 14-16). The painted designs include groups of vertical lines on both sides of the rim, groups of horizontal lines, horizontal lines connected to oblique curves, groups of short horizontal lines, horizontal bands running round the shoulder with hatched diamonds joined to the lowest horizontal line, and groups of curved lines arranged in pyramidal forms. The paintings are invariably done on rims, shoulders and waists mostly on outer surfaces, but sometimes on inner surfaces, particularly of bowls. The main types include vases, jars, basins, dishes, bowls and lids (domical and stopper-like) with conical finials of different sizes.

As regards minor antiquities, a good number of hopscotches made on potsherds and stone; bone points, chisels and perforators and a few iron objects were found. Besides, a few bangles of glass and shell; beads of terracotta, glass and shell; and a lone microlithic point on chalcedony were also found from the excavation.

The painted designs such as hatched diamonds, basket weaving design followed by comb or bird's feet-like design and other designs are very much comparable to those found from the habitational and burial sites of the Megalithic culture in Vidarbha. On the basis of the pottery, microliths, iron objects, makeup of floors, hut plans, etc., the entire habitational deposit can be considered as belonging to the Chalcolithic-Megalithic cultural complex.

47. EXPLORATION IN DISTRICTS NANDED. — In course of submergence area of lower Penganga river project M. Mahadevaiah of Aurangabad Circle of the Survey noticed the following antiquarian remains.

TaluklTehsil	*Village/Site*	*Nature of remains*
Kinwat	Bhampur	Middle palaeolithic tools
-do-	Chinchkhed	Middle palaeolithic tools
-do-	Khambhala	Middle palaeolithic tools and microliths, etc.
-do-	Satiguda	Middle palaeolithic tools

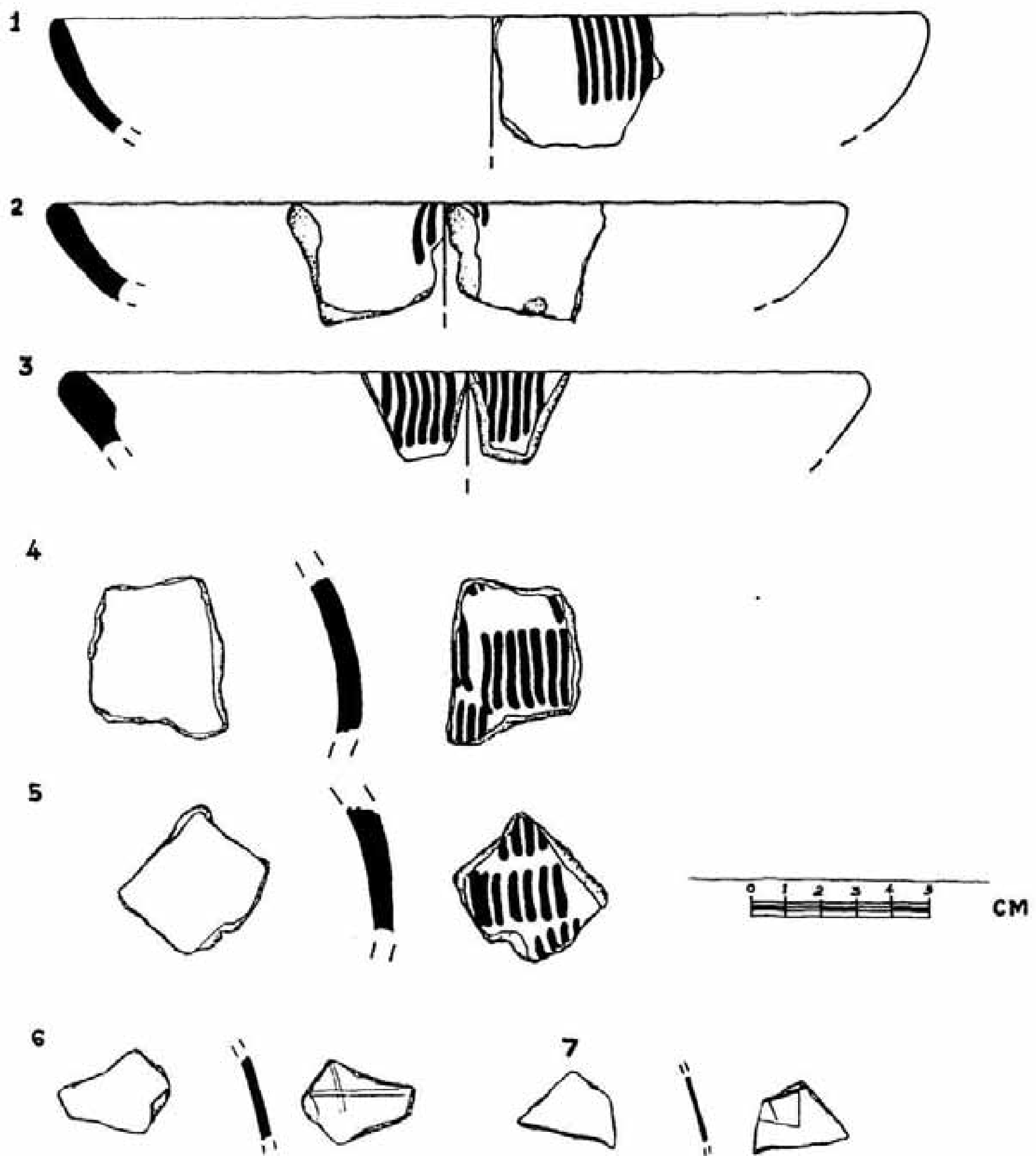


FIG. 14. *Shirkanda : Painted sherds*

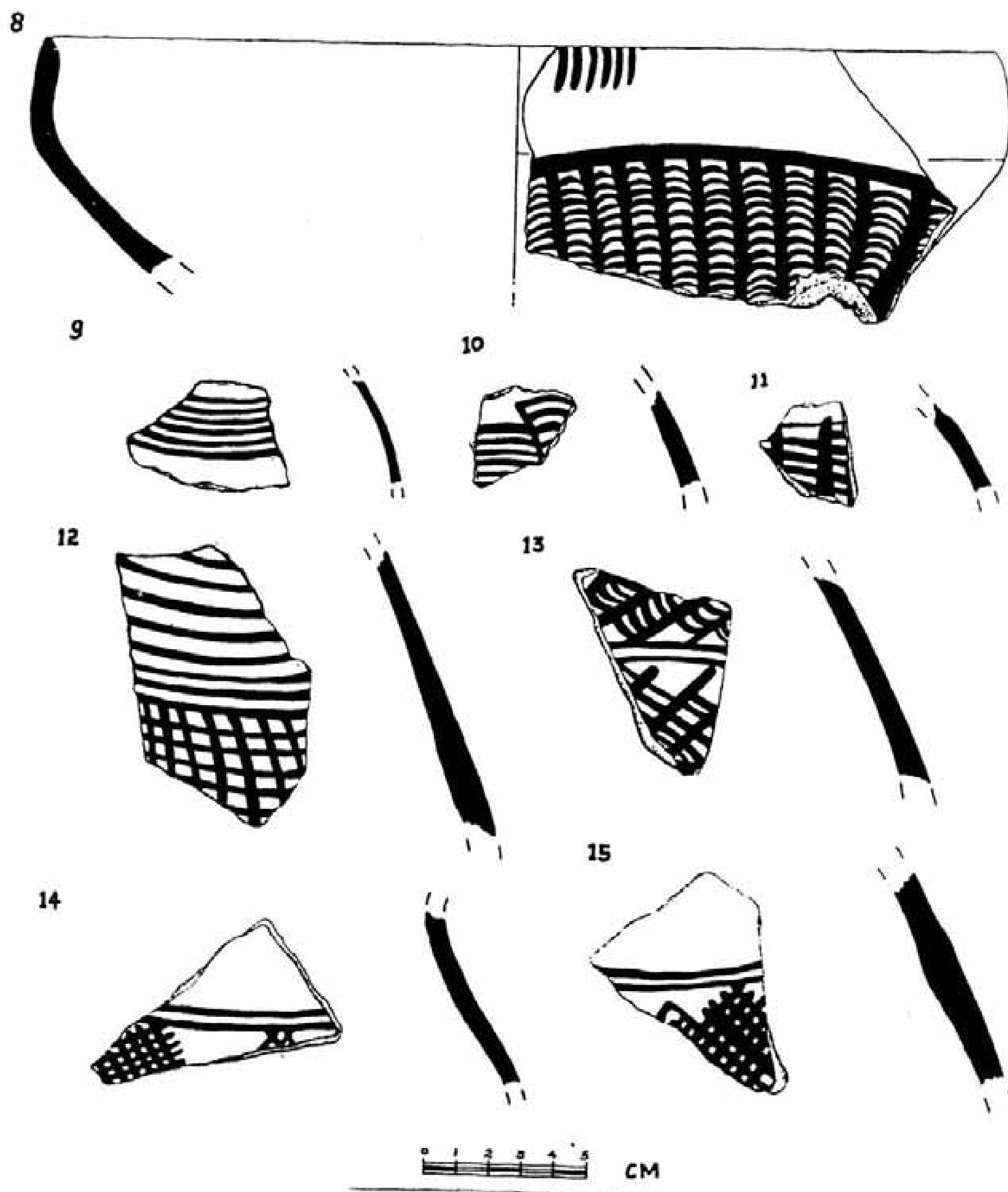


FIG. 15. *Shirkanda : Painted sherds*

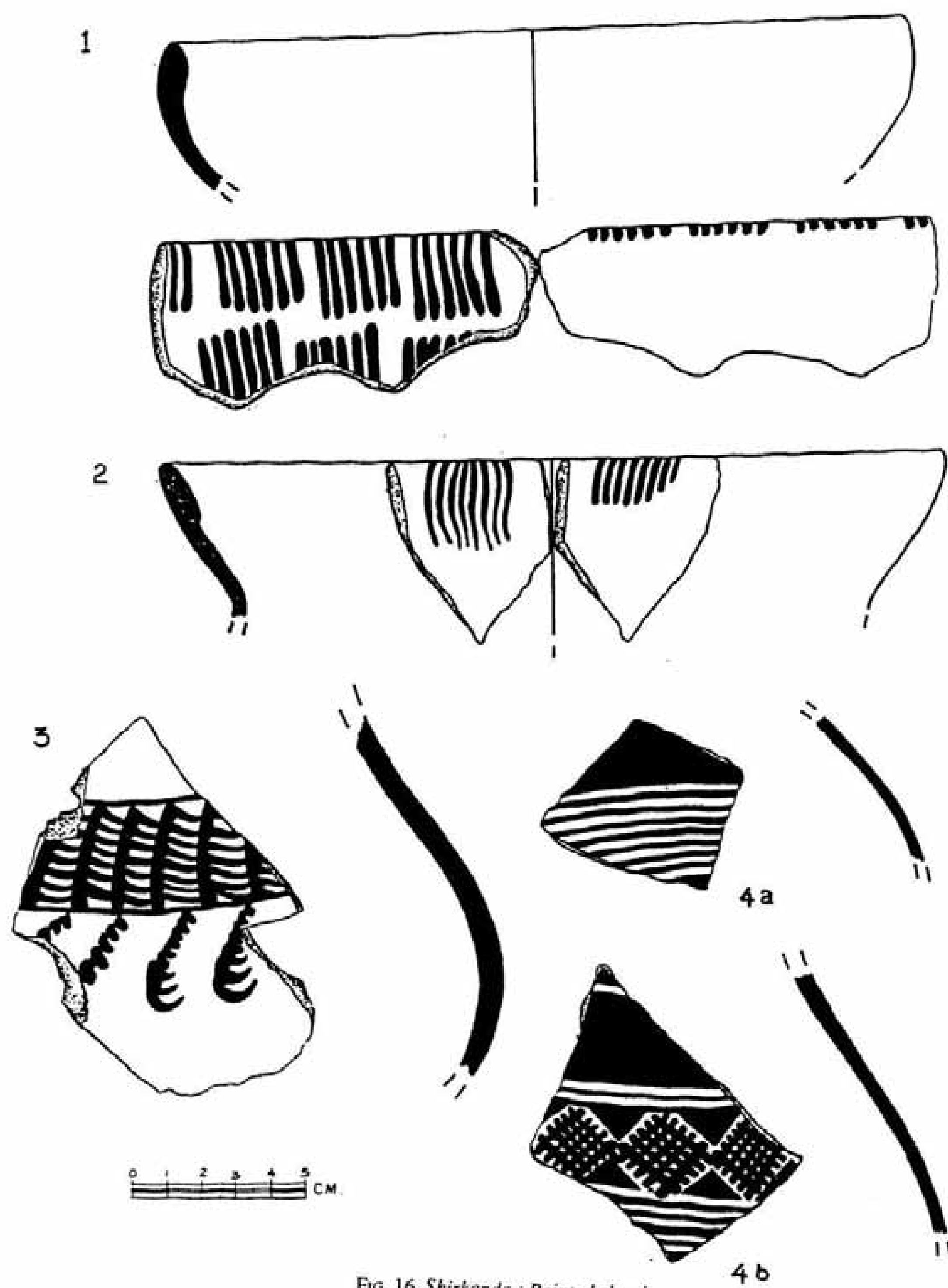


FIG. 16. *Shirkanda : Painted sherds*

48. EXCAVATION AT ARAMBHA, DISTRICT WARDHA.— Amarendra Nath assisted by N.C. Prakash, N.K.S. Sharma, S.K. Gulrandhe, H.J. Barapatre and S.M. Khairkar of Excavation Branch I of the Survey, Nagpur undertook trial excavation with a view to know the sequence of culture at Arambha (20° 34' N; 78° 59' E) in taluk Samudrapur. It lies 72 km south-west of Nagpur on the right flood plain of river Pothra, a tributary of Wunna which, in its turn, forms part of the Wardha system. The site, virtually engulfed by the present day habitation, rises over 3 m from the surrounding plains and forms a natural slope towards south-east and along its periphery a couple of monsoon run-off flow from a higher plain of northwestern side of the village which ultimately joins the mid-stream of Pothra.

The cutting at the site revealed five periods of occupation characterized by typical ceramic types, however, the yield of other household items remained handful.

Period I had 65 cm deposit in thickness and was essentially brown in colour with patches of black cotton soil. The cultural component was less in quantity as major portion of the stratified deposit was disturbed due to later pit activity, at the same time the remaining undisturbed portion of the layer could not be excavated in order to preserve the U-shaped hearth of this period (pl. XL). The hearth had an opening (25 cm wide) towards north. The side walls on an average were 13 cm in thickness while its back was 20 cm thick. The available height of the wall noted in the section was 15 cm. Its chamber contained ash, charcoal bits and potsherds.

As far as the ceramic industries are concerned no distinguishing feature could be noticed to classify the pottery types of Chalcolithic and Iron Age. This overlap was also noticed at other excavated sites of Vidarbha. Besides the plain pottery types, the diagnostic painted pottery types of the period were Black-on-red ware, black painted black-and-red ware and white painted black-and-red ware. The paintings on them were confined to rim and shoulder portions of the vase and carinated *handi* which included variants of comb and palm leaf patterns and vertical strokes.

Other than a stone hopscotch, no antiquities could be recovered from this horizon.

Period II, on an average 30 cm in thickness was composed of brown earth mixed with charcoal bits and bones. It had patches of floors prepared out of stone chips, dust and mud. The typical black-and-red ware bowls and dishes generally associated with the NBPW started occurring in this period. A tiny NBP sherd of a bowl was also reported from this horizon. Other important antiquities of the period included shell bangle fragments (pl. XLI A), crystal bead, whet stone and fragment of iron rod.

Period III on an average 35 cm in thickness was composed of dark to pale brown soil. It yielded red ware sherds, some had typical decorative designs of Satavahana times. The surface colour of sherds varied from dull red to bright red. The shapes met with were vase, bowl, basin and lid-cum-bowl. A platter reported from this horizon was comparable to the one found at Prakash. The decorated designs comprised of finger-tip decoration, multiple grooves, oblique notches, foliage and flowers and converging lines forming triangles.

The most important find assigned to this horizon was the discovery of a terracotta coin mould attributed to the Sakas. Of the mould, only the reverse counterstruck portion could be located in a well preserved condition, but the devices and legend on its countersunk surface were feeble. On the basis of partial reading it has been attributed to Rudradaman I, son of Jayadaman of Castana line. The other

significant objects were a copper ring of spiral-shape with their ends coiled at the top, a terracotta spool-like ear-stud incised with radiating rays, a potter-wheel, possibly used as a spindle whorl, lime stone, agate and carnelian beads and an iron ferrule.

Period IV was composed of dark brown soil, charcoal bits, bones and rolled stone fragment. It was characterized by red polished ware, the shapes met with were: basin, lid-cum-bowl, bowl and vases. One of the sherds of a vase on its shoulder portion bore a fragmentary inscription. The inscription incised in Gupta-Vakataka characters reads from left to right *n (e* or *i) chha* (pl. XLI B). The legend is incomplete yet it helps in fixing the chronology of this horizon. Other important finds included semiprecious and terracotta beads, shell bangles and sculptured stone objects. The head of a mother goddess carved in round on a buff sandstone is one of the finest discoveries at Arambha (pl. XLI C). The treatment of facial features and coiffure are *of par excellence.* It has puffy nose and lips with prominent pout. The outsized eyes are wide open *(akarnanta-netrin).* The arch-like treatment of eye brows increases the charm of the face. The hair, laboriously divided at the centre of the forehead, is represented by delicate lines. The braided hair into two side buns has incised decoration of latticed diamond, while the hair braided at the back has chevron motif. Another carved fragment from the site depicting a foliage motif in relief on a schist is reminiscent of the door-frames of the Gupta-Vakataka edifices.

Period V composed of layers (2) and (1) introduced grey pottery resembling the types belonging to the medieval period. From this horizon glass bangles and terracotta beads were noticed.

49. EXPLORATION IN DISTRICT YEOVATMAL.— In course of submergence area of lower Penganga river project M. Mahadevaiah of Aurangabad Circle of the Survey noticed the following antiquarian remains in the district.

Taluk	*Village/Site*	*Nature of remains*
Ghatanji	Aita	Middle palaeolithic and microlithic tools, mutilated Ganesa sculpture, raft-stone belonging to the sixteenth century AD
-do-	Bilayata	Middle palaeolithic tools
-do-	Chimta	Middle palaeolithic tools and microliths
-do-	Guda	Middle palaeolithic tools
-do-	Ghoti	Middle palaeolithic tools, pillared *mandapa* on the hill with *linga* and mutilated sculptures inside the *mandapa* with sixteen pillars, probably of eighteenth century AD; a residential building, i.e., *Wada* belonging to late medieval
-do-	Kelapur	Middle palaeolithic tools, a temple of lord Siva known as Kapileswar situated southern side of the village, datable to the eighteenth century AD

Taluk	*Village/Site*	*Nature of remains*
Ghatanji	Khadaka/Khadki	Middle palaeolithic and microlithic tools, residential building of eighteenth century AD, Muslim and British coins
-do-	Kap	Prehistoric tools, temple dedicated to lord Siva known as Kapileswara, datable to seventeenth century AD
-do--	Kawatha BK	Middle palaeolithic tools
do--	Kawatha (Khd)	Middle palaeolithic tools
do-	Kapeswar	Middle palaeolithic tools
	Manushdari	Middle palaeolithic tools
	Ratnapur	Middle palaeolithic tools
-do--	Sawali-Sadoba	Middle palaeolithic tools
do--	Umari	Middle palaeolithic tools
do--	Virul	Middle palaeolithic tools
do--	Waruda	Middle palaeolithic tools
do--	Zari	Middle palaeolithic tools
do-	Zaparwadi	Middle palaeolithic tools

MANIPUR

50. EXCAVATION AT KANCHIPUR, DISTRICT IMPHAL.— In continuation of last season's work *(1990-91,* pp. 50, 52), the Department of Archaeology, Government of Manipur under S. Rupoban Singh, assisted by K. Indrani Devi, N.K. Singh, L.I. Singh and K.G. Singh resumed excavation at Kanchipur the ancient capital site. The main objective of this year's excavation was to unravel the details of different structural phases of this complex.

In the course of excavation extended over an area of 146.50 sq m, a brick built royal chamber and an underground secret passage running in north-south direction to a length of 19-88 m were discovered. The secret passage which was located under the royal chamber was built of well-fired *lakhaui* bricks and its roof has a semi-cylindrical vault. The depth of the secret passage is 1.65 m from the top. The thickness of the wall of the passage varies from 0.50 m to 0.58 m. The width of the passage is 0-68 m at the top and 0.78 m at the bottom. Further the roof of the passage is capped by masonry brick slabs varying in length, but its thickness is 0.10m and the breadth is 0.25 m. The two terminal points of the passage to the north and south end are of similar style. Three flights of steps with moonstone of burnt-bricks were found at both ends.

The exposed royal chamber was well plastered with lime mortar and four pillar hole s at each corner of the room were also found. The pillar holes are circular in shape with a diameter of 0.45 cm.

The roof of the secret passage has caved in and the passage inside was filled with brick-bats and loose earth from the top. While cleaning the passage one circular bell metal coin with the legend *'Shri'* and a British coin of 1935 were recovered. Besides, number of potsherds, both plain and stamped variety along with *chilumlkankar,* parts of an antler, two iron axes, pig bones were also reported. Of these perhaps the discovery of *chilum (kankar)* is significant on which is engraved, the name of its owner, in archaic Meitei script and Bengali alphabet.

The pottery types include bowl, shallow dish and pot with globular body. The pottery is mainly the red ware which is, reddish brown in colour. Further, excavation of the site could unravel the layout of the capital complex.

MEGHALAYA

51. EXCAVATIONS AT VADAGOKUGIRI, DISTRICT WEST GARO HILLS.— The Prehistory Branch of the Survey, under the direction of A.K. Sharma, assisted by S.S. Gupta, N. Taher, K.M. Girhe, R.K. Dwivedi, N.K. Nimje, Ghayasuddin, C.L. Yadav, P.S. Pashine, S.M. Shambharkar, V.W. Pathak, P.V. Janardhanan, P.C. Dogra, T.B. Thapa, R.G. Katole and R.N. Sharma, undertook excavation at Vadagokugiri (Bhaitbari) (25° 50' N; 90° 00' E). The site is located 235 km west of Guwahati on the left bank of earlier course of Brahmaputra in West Garo Hills. Major part of the site and structural remains are located on highly dissected and moderately elevated hill tops mostly composed of red loam and lateritic soil.

A mud-cum-brick stupa on the western fringe of the fortified township has been discovered. The stupa is located just in front of the water way entrance to the town. It is 5.75 m high and has a diameter of 30 m at the bottom. It is the first stupa discovered in Meghalaya.

The whole structure is built in a pyramidical fashion with three receeding tiers of brick platforms. On the southern side where the brick structures are more intact, on each side of the central flight of steps three rectangular boxes have been raised. These boxes have been filled with brick bats and compact clay. Maximum length of the rectangular boxes is east-west. The walls of the boxes are 0.50 m wide.

In the receeding order the lowest wall is 12.70 m long, second wall is 900 m long, third wall is 5.10 m long where the topmost wall is 4.20 m long. Inner width of the lowest box is 2.35 m, middle box 2.10 m and the topmost box is 1 .85 m. The space below the lowest rectangle has been paved with brick bats. The total length of the flight of steps including the two platforms of paved brick at the two lowest levels is 13.60 m. In total there are twenty-six flights of steps with each step 0.30 m in width and 1.10 m in length east-west. Below the lowest step there are two brick paved platforms at two levels. The first one is 1.10 m in length. The flight of step lined by 1.20 m wide walls on both sides, i.e., on east and west. Above the topmost step and box, the remaining space upto top of stupa is filled with rammed earth. On top there might have been *harmika* which is missing. Maximum courses available m the walls of the steps are eleven whereas in the walls of the rectangles upto sixteen courses are available (pl. XLII; fig. 17).

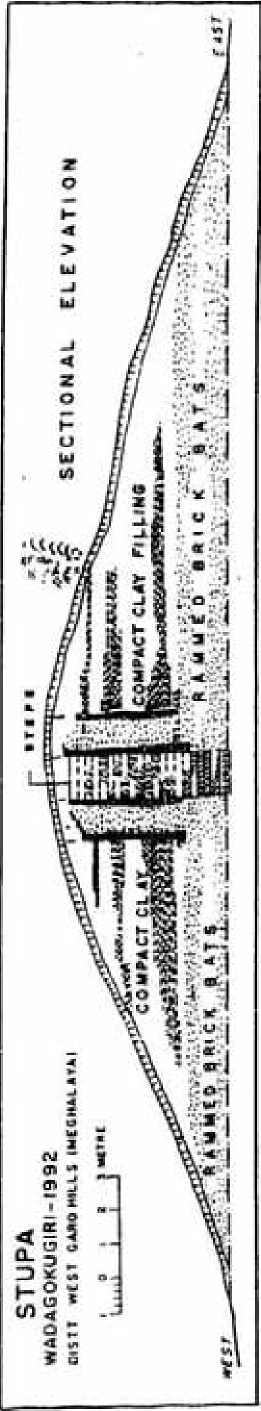

STUPA
WADAGOKUGIRI-1992
DISTT WEST GARO HILLS (MEGHALAYA)
METRE
SECTIONAL ELEVATION
COMPACT CLAY
COMPACT CLAY FILLING
RAMMED BRICK BATS
RAMMED BRICK BATS
WEST
EAST

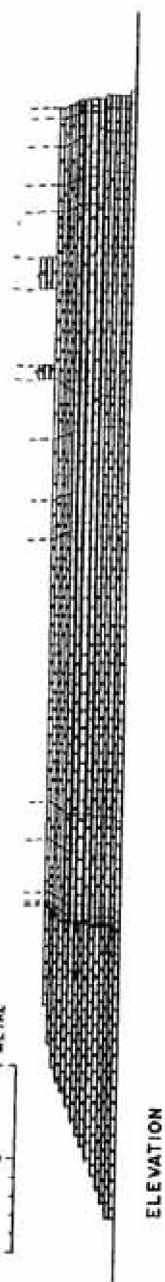
Fig. 17

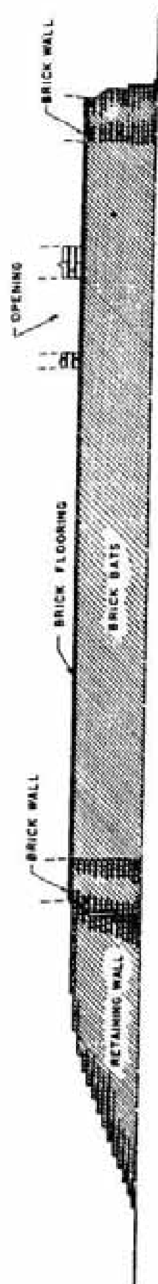
By further digging below the bottom of the stupa three more habitational layers have been encountered. From surface the depth is 040 m from the present ground level. These layers have yielded brick-bats, fine grey-ware, charcoal, animal bones, refuge pits and rammed floor. The floor of the house is heavily burnt. Over the floor a thin layer of fine river sand is found. This indicates heavy flood, due to which the inhabitants abandoned the area. As the bottom most habitational layer and house floor are below the present ground level, it is apparent that the river bed was much deeper with high embankments and plenty of deep water flowing in it. Layer 3 and pits cut into it have yielded hand-made grey and red ware. The pottery is thin. Grey ware is decorated with stamped circular designs while the red ware bears straw designs on outer surface.

From the occurrence of hand-made pottery the antiquity of the lowest level of this settlement could be fixed beyond second century BC. The pottery is comparable to those from Sekta in Manipur and various other sites in Indo-Gangetic plains.

Investigations so far conducted indicate that there are atleast two groups of temples. One located almost in the centre of the township while the other on the southwestern side near the river bank. In each group atleast ten to twelve temple sites could be located. In the first group there are two tanks, one bigger and the other small. Most of the temples of the second group are located around a beautiful rectangular tank which has still plenty of water and blooming red lotus flowers.

Exposed plan of a burnt-brick temple (fig. 18) shows three components, the *garbha-griha,* the *antarala* and the *mandapa,* (pl. XLIII). It faces east and the outer walls are decorated with beautiful terracotta tiles. Maximum length of the temple (east-west) including the retaining wall behind the *garbha-griha* is 11 m. The retaining wall is 2.22 m in width. The temple has been built of *pancharatha* plan with several offsets. The foundation consists of brick rubbles. Both the *garbha-griha* and the *mandapa* are square on plan inside, the *garbha-griha* is 4.40 X 4.40 m whereas the *mandapa* is 2.50 X 2.50 m. The *antarala* is 0.90 m in width. The walls are of burnt bricks (27 cm X 13.5 cm) and width of the wall is 40 cm. Nearly thirteen courses of bricks are available. Before the temple is dedicated to the God, worship was performed as the traces of circular rammed and charred earth with charcoal, just in front of the entrance to the *mandapa* would suggest. All around the temple evidence of erecting scaffoldings is available in the form of post-holes. This is for the first time that such post-holes for scaffoldings have been noticed. Except the back side of the temple, all the other three sides and particularly the space between the two corners of the *rathas* were decorated with terracotta tiles above the *tala* and below the *griva* region. The tiles were fixed on the walls with the help of one or two holds luted on the back of the tiles, which vary in size from 35 X 25 X 3 to 46 X 25 X 5 cm. These depict the figures of gods, goddesses, ascetics, *yoginis,* pregnant ascetic woman seated with outstretched legs, dancing figures, etc. The noteworthy amongst them are, however, a four-armed Ganesa image holding *a parasu* in upper right hand, *mulaka* in upper left hand, *modaka* in lower left hand while the lower right hand in *varada-hasta mudra* (pl.XLIV A). Some of the figures are shown seated inside a temple. The deity is always accompanied by his *vahana, Mushaka* (rat). The sacred thread is in the form of a serpent; Shri Rama in bow breaking *mudra,* wearing *kirita-mukuta* and *kundalas*; Parvati, four-armed, seated in *padmasana* in *dhyanamudra,* flanked by two ladies one each on two sides, and a squatting figure below; Aashitosh Bhairava; Taraka in the form a of demon, wearing beaded necklace; Kali with


WADAGOKUGIRI - 1992
DISTT. WEST GAROHILLS
(MEGHALAYA)
TEMPLE NO.1
0
1 METRE
ELEVATION


BRICK WALL
OPENING
BRICK FLOORING
BRICK BATS
BRICK WALL
RETAINING WALL
SECTION AT A-B

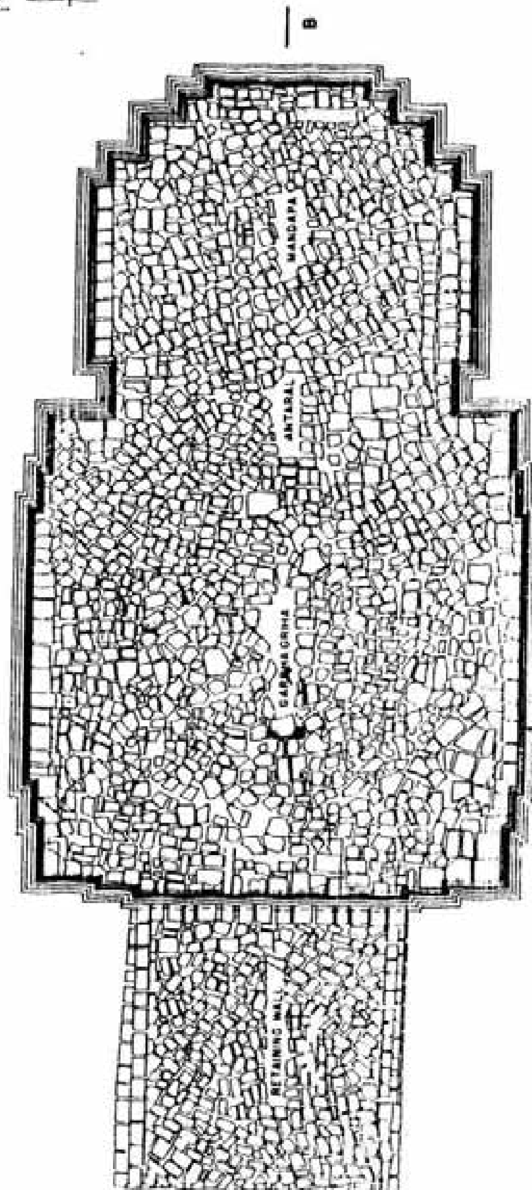

N
B
MANDAPA
ANTARAL
GARBHAGRIHA
RETAINING WALL
A
PLAN

Fig. 18

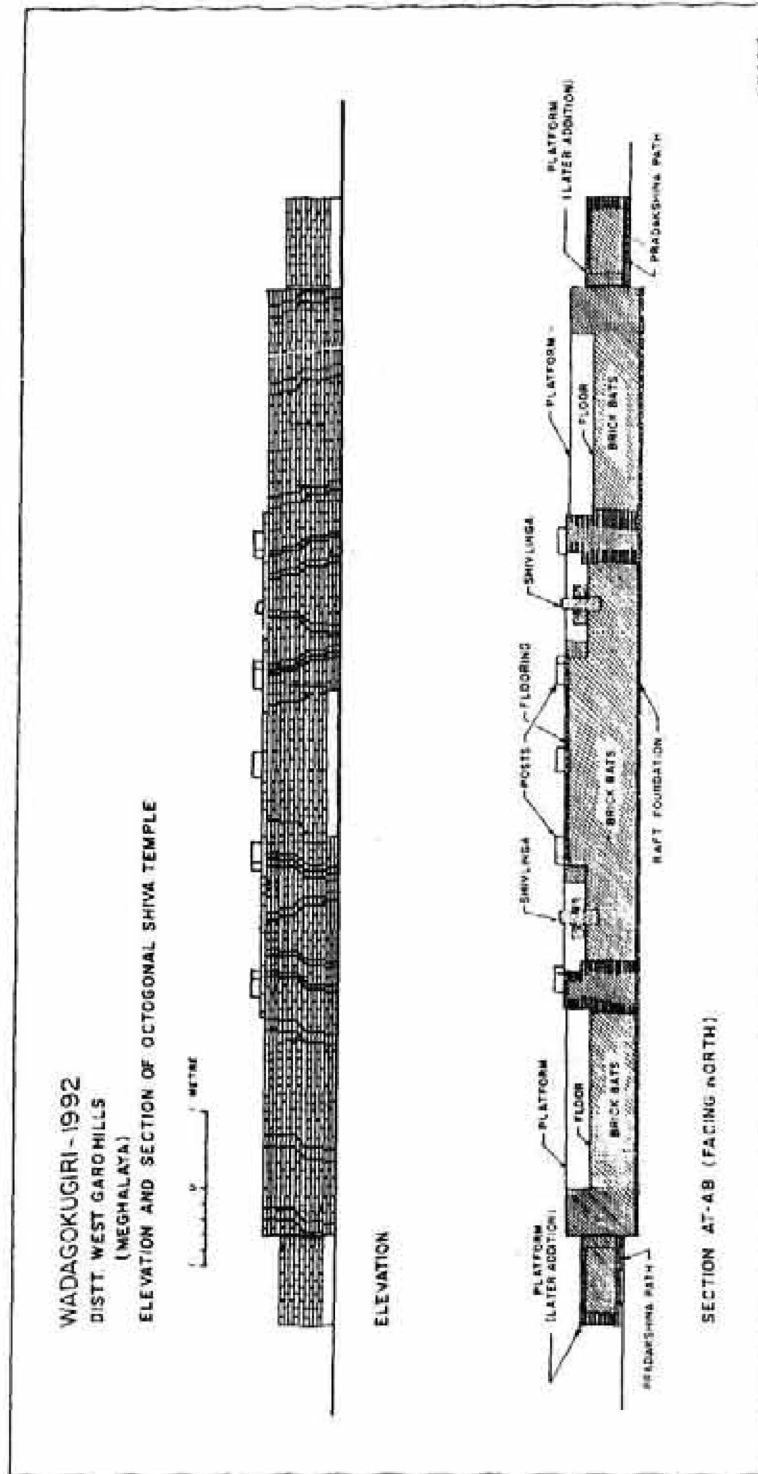

WADAGOKUGIRI - 1992
DISTT. WEST GARO HILLS
(MEGHALAYA)
ELEVATION AND SECTION OF OCTOGONAL SHIVA TEMPLE
METRE
ELEVATION
PLATFORM (LATER ADDITION)
PLATFORM
FLOOR
BRICK BATS
SHIVLINGA
POSTS
FLOORING
RAFT FOUNDATION
PRADAKSHINA PATH
SECTION AT-AB (FACING NORTH)

FIG. 19

dishevelled hair, protruded tongue, *mundamala* and dagger in her right and *kapala* in the left hand; Sarasvati holding *veena;* musician playing *mridanga;* Arjuna seated in penance to secure a powerful weapon from Siva to destroy his enemies, for depriving the Pandavas of their kingdom four-armed seated Brahma in *dhyanamudra* (pl. XLIV B) with the image of flying Vishnu holding a garland in the upper right; Durga; and lastly a fragmentary tile with five caprisoned horses in the bottom, perhaps depicting the chariot of 'Surya'.

The figures have been beautifully carved out in relief and each one is a masterpiece of art. Besides, an anthromorphic stone found in the southern side of the temple appears to have been used as a sacrificial stone. On the stylistic grounds of the terracotta tiles, the temple could be dated to *circa* ninth-tenth century AD. The discovery of engraved elevation model of a temple on two huge boulders in a *nullah* within the fortified area shows that the temple was probably a *rekha-deul* type, the *sikhara* of which was atleast six-storied. In one of the boulders the *amalaka* and *kalasa* portions are missing whereas in the other, only these portions are present. But they are definitely two different entities. These specimens would suggest that these perhaps served as models engraved on rocks.

Unique octagonal Siva temple has also been exposed (fig. 19). The main octagon is 6-90 m in diameter with each arm measuring 2.70 m. The width of the walls is 0-40 m. Inside the main octagon there are eight miniature octagons each having a *Siva.-linga* inserted inside a *yoni,* centre of which is also octagonal to hold the *linga.* The lower part of *linga* is square. There ought to have been a miniature octagon in the centre also, housing a *linga,* thus making it a *'Navagraha'* type of temple.

The entire floor of the temple is paved with burnt-bricks. From the arms of the main octagon radiate eight square platforms, each arm of which is again 2.70 X 2.70 m. The side arms are *tri-ratha* on plan with beautiful mouldings. The discovery of a few terracotta tiles with figures indicate that the outer surface of the walls above the floor level was decorated with these tiles. In one of the tiles, Siva is shown seated on a naked body and holds a human head. The platforms were used for performing rituals. Later on, probably to increase the accommodation for devotees, to each square platform a rectangular platform measuring 1.15 X 2.70 m was added. At the junction of the two arms of the main octagon and between the two miniature octagons square stone pillar bases are found on which stood, most probably, wooden pillars to support the over-head roof.

The diameter from square shrine to square shrine is 12.30 m. Each *Siva-linga* had independent approach through the platforms.

From the amount *of debris* recovered and the constructional methods adopted, it is clear that above the floor level, the superstructure was resting on wooden poles, eight on the corners of the main octagon, thus making the superstructure an octagonal one. The roof might have been of bamboo and grass, befitting the environment and the local constructional style.

The mud-cum-burnt-brick fortification runs into atleast 5 km in a circular fashion, a part of which runs along the left bank of the river. The fortification has been laid taking advantage of the contours of the hills. All along the outer side of the fortification a very deep moat runs, whereas on the inner side a rammed *murram* pathway which is 3-30 m in width runs throughout the length of the fortification wall. Cuttings were made at two places in order to ascertain the width and strati graphic position of the mud

and brick wall. It is evident that in the first phase only a mud rampart, having a width of nearly 6 m was raised. Later on, in order to further strengthen the outer face, a 1.20 m wide wall of burnt-bricks was raised. Evidence shows that the fortification wall was enlarged atleast three times. So far fifty-two courses of bricks have been exposed. A study of one of the cuttings clearly shows that the burnt-brick wall, repaired atleast twice, was raised over the foundation of boulders. A gateway on the eastern side has also been located. There are a number of bastions at the turnings. There were atleast four gateways, one each in each of the four directions. On the western side, in front of the stupa, there is nearly a 40 m wide gap in fortification. The gap is now filled with silt. The two ends of the brick wall show rising trend indicating that there might have been a gateway to the river, through which berthed boats could be approached.

Inside the fortified area, particularly in the western half, there are well laid pathways paved with brick bats. These pathways have been laid in such a way that they divide the whole area in squares and rectangles. They lead from one temple to the other, from tank to river, etc.

In all archaeological sites and particularly in the habitational area huge quantity of animal bones are found littered all over. Surprisingly, this is the only site where inside the fortification including the habitational area not a single bone was found. This appears to be an important factor and points out both the religious nature of the complex as also the sanitary habits of the inhabitants.

NAGALAND

52. EXPLORATION IN DISTRICT KOHIMA.— A.K. Sharma, assisted by S.B. Ota, R.K. Dwivedi, C.L. Yadav and Gayasuddin of the Prehistory Branch of the Survey located a mound in village Sachema, 25 km north-west of Kohima at the height of 1500 m. Neolithic hand-made black coarse pottery were collected from the mound. The settlement appears to have been fortified with stone rubbles creating zig-zag lanes and by-lanes. As per legend, the village, from earliest times, was known for its cattle and rice products. In the steps leading to the village, hoof marks were noticed on soft Himalayan cist.

In the outskirts of village Kiruphema, 6 km north-west of Sachema, apart from hand-made black and grey coarse pottery, an important evidence about the fertility cult was traced. A socket cut in the shape of a female organ, on a big boulder is being worshipped even today as an object of fertility cult.

At Kigwema, 16 km south of Kohima from where Neolithic celts, pestles and pounders were recovered earlier, now in the possession of Riikrielhous, eight well burnished hand-made gourd-shaped jars of different sizes (biggest being 75 cm tall) were located. They are made of Kaolin and are very thin, light and sturdy. Some of them have immitation of stitching marks in the neck region. They resemble the Roman Amphoras except for the handle which is absent.

53. EXPLORATIONS IN DISTRICTS MOKOKCHUNG AND TUENSANG.— Under a research project entitled "Archaeological Exploration in Nagaland", T.C. Sharma of the Department of History and Archaeology, North Eastern Hill University, Nagaland assisted by Y. Ladong of the Directorate of Art and Culture, Government of Nagaland, and Wati Jamir of the Department of Anthropology, Science College, Kohima carried out explorations in the Changki and Chungliyimti areas of Mokokchung and Tuensang districts respectively.

As per Naga traditions and folklore, the Chungliyimti (94° 45' E; 26° 24' N, and altitude 1672 m MSL) is considered to be the most ancient habitation area in the state. The Nagas believe that the spot, called Longterok, where exist six standing monoliths and horizontal slab with a large perforation at the centre representing the male and female stones respectively, is the original place of several Naga groups presently inhabiting different parts of Nagaland.

The aim of the present investigation was to ascertain on the basis of the Archaeological evidence, whether there was any evidence of Stone Age habitation in this area to prove the Naga traditional belief.

The antiquities consisting of polished Neolithic celts, potteries, grinding stones, stone rubbers and pestles, stone ear-rings, whorls made of stone, all found on the eroded surface of the hill slopes, confirmed beyond doubt that the site was inhabited during the Neolithic period.

The Neolithic celts found at the site are of shouldered type, indicating grinding technique. The spindle whorls are made of sandstone. The grinding stone, mullers and pestles are of various sizes and shapes and made of a very fine variety of sandstone. The pottery is hand-made of coarse variety, made of gritty tempering material and ill-fired. They were made by the beater and pad technique, grooved beater impressions being visible on the exterior surface of the potsherds.

ORISSA

54. EXCAVATIONS AT BARABATI FORT, DISTRICT CUTTACK.—In continuation of last year's work *(1990-91,* pp. 53-54) the Excavation Branch IV of the Survey under the direction of B.K. Sinha, assisted by K. Veerabhadra Rao, N.K. Sinha, P.N. Biswas, P. Biswas, M.P. Singh, S.K. Bhoi, R.N. Sahoo of the branch and I.M. Tikku and S. Chatterjee of the Headquarters Office, resumed excavations at the high mound situated inside the Barabati Fort, Cuttack.

The aim of this season's work was to follow the foundations of the temple of Period I (found last year) across the pillars of the palace on the eastern side; to locate the south-eastern corner of the citadel wall as also on the eastern side; to trace the citadel wall on the northern side and extension of plastered wall towards the eastern side forming the northern corridor of the palace and other structures if any, on this side.

Excavations, in the northeastern corner of the palace showed that the base of the temple, found last year and seen going below the laterite pillars of the palace, extended further east, and although badly damaged, was available to a total length of 11-5 m. The platform of the temple, made of laterite blocks, was found to a length of 17 m east-west. Though much robbed, the platform and mouldings continue westwards. The moulding of white sandstone are on the edge of the platform which in reality is the core of the temple base (pl. XLV A).

A small portion of this platform, on the eastern side, was seen having a flooring of white sandstone slabs. Near this white sandstone flooring was found a pillar base, the pillar has been removed.

Beautiful sculptures representing erotic couples, musicians, female heads displaying a variety of ornaments and different hair styles, lotus pedestals with broken images, architectural friezes showing rows of elephants, akin to those used in the base of the Sun temple at Konarak and pieces of *anga sikharas* were recovered from this area. The most important sculptural find consists of a bracket figure

of chlorite, collected from the pillar base. The 1-5 m high image, broken in two parts, with mouldings in the lower portion akin to those found in Orissan temples also deserves mention. The upper part contains two female *chauri* bearers standing back to back. The two *chauri* bearers were identical and are distinguishable only by the manner in which the *chauri* is held, i.e., in one case it is held straight upto the shoulder while in the other, it is held across her chest. The image is datable to *circa* thirteenth century AD.

Excavations on the eastern, south eastern and northern sides were also taken up during the period under review. After the removal of encroachments, south eastern corner of the citadel wall was found and citadel wall itself was traced to a total length of 35 m on eastern side.

Excavations in the area east of the citadel wall brought to light a gateway complex. A low ramp provided access to the threshold 4 m in length and made of khondolite blocks. The threshold, showing wearing marks, opened into an entrance chamber measuring 4 x 6 m. On the inner side of the threshold were found two triangular blocks of chlorite stone. Iron sockets placed inside these blocks showed that these were used as mortices of the tennons. The chlorite blocks were placed 2.8 m apart and it appeared that the gateway complex consisted of a main entrance 2.8 m wide and an ancillary entrance 1 -2 m wide. The exterior of the gateway complex was decorated with mouldings (pl. XLV B).

On the northern side of the palace, excavations revealed the existence of the northern side of the citadel wall. On this side the citadel wall was uncovered to a total length of 35 m. As found on the other two sides, the wall on this side has a thickness of 4-25 m and shows traces of lime plaster on the exterior. Butting east of this wall was found traces of another wall having a steep ramp and some projections and gaps possibly for carrying and mounting of guns.

Excavations in the north of the palace showed plastered wall (length 13 m) east-west forming the northern corridor of the palace. It had a thickness of 2 m and its outer side also contain lime plaster.

One more pillar of laterite blocks further east of the wall was brought to light, thus making the number of pillars used in the palaces to thirty-four.

55. EXCAVATIONS AT LALITAGIRI, DISTRICT CUTTACK.— In continuation of previous year's work *(1990-91,* pp. 54-55), G.C. Chauley, assisted by J.K. Patnaik, S.K. Chatterjee and S.K. Dey of the Bhubaneswar Circle of the Survey, resumed excavations in the western slope of Landa Pahar towards north-west of *chaityagriha* (apsidal) in the same axis of LTG-2 area.

Another mound in the same area of LTG-2, adjacent to main road, leads to Museum in the eastern slope of same Landa Pahar. It is a small oval-shaped mound in front of modern *mat ha* which was also taken up for excavation in order to expose partially the Monastery 4.

The main purpose of excavation was to ascertain whether the western slope area under review had any independent monastic establishment like that of Monastery 3 and 1; to seals/sealings or any other inscribed material referring to this monastic complex as Mahavihara; to determine the antiquity of the site which has already uncovered remains datable to the Kushana period.

This year's excavation in and around banyan tree area (western slope) exposed the earlier structure belonging to the Kushana or even to the earlier phase. The area is devoid of monastic structure. The oval-

shaped mound in the eastern slope of the hill partially exposed the structure (Monastery 4). In addition to the structural remains excavations also revealed few inscribed potsherds (pl. XLVII A), white stone, *Gaja-simha* (pl. XLVII C), Avalokistesvara (pl. XLVII B), etc.

The structural activities encountered here point to atleast three phases, the lower most being the layer 4. From this layer pottery of black and red ware, black-slipped ware, coarse variety of combination of NBP alongwith tiles and rectangular half exposed brick structure of three to four courses have been collected. Underneath, there is a lime flooring which seems to be contemporary with the apsidal *chaityagriha* and Kushana inscription. Layer (4) is distinct with two pieces of inscribed potsherds of second-third century AD. Layer (3) yielded Gupta moulded pottery apart from a potsherd decorated with lion slayer motif. This phase is also very poor in so far as structural activities are concerned except two or three irregular brick courses. In layer (2) inscribed potsherd of Gupta character were noticed. Structural activity shows only a large wall of 1 m, running all along north-west and south-east. A huge brick-cum-stone drain on north-west and south-east corresponding to the main wall was exposed. Further, between the drain and the main wall in the complex, exists a structure with holes/domestic appliances, a brick jelly-paved floor of about 3 X 3 m and profuse potsherds, suggesting its use probably as kitchen. Further, there were bases of two large brick stupas of which only the basement of one course now partially exists. In the habitational layer also was noticed a soak pit of bricks. In this area under review was encountered boulders. Cutting across the boulders was a parallel brick wall which was probably meant to divert the accumulated water through the drain. In this area total cultural deposit was about 3-8 m (maximum) with mixed material, brick bats but without any evidence of structure. Pottery from the area comprised black-slipped and red-slipped wares. Besides, huge tiles with finger impression, inscribed and moulded potsherds, copper-pieces, lion-slayer motif (?), fragmentary seals (pl. XLVII D) datable to eighth-ninth century AD, were found.

In continuation of previous year's work central baulk was removed to get a perspective view of the Monastery 3 (pl. XLVI) as a whole. All the periphery (outer wall) of monastery was cleared of *debris*. Further the southern corner of the monastery was taken up for digging, showing the cell with a niche in the right side entrance. In the same corner a flight of eleven steps made of stone blocks (width 1.25 m), each step of two blocks of 15 cm height was also unearthed. This confirms the use of the monastery by the people of atleast two phases. In the course of further digging in the monastery complex there appeared a courtyard made of stone flooring (9 X 9 m). Its kerb out line is 0.5 m all around. There is also a provision of drain made of stone in the north-east corner of the courtyard which cuts across the verandah cell and extends in the eastern wall (outer). In the eastern wing (entrance side), north-east corner cell found a recessed wall measuring 1.2 m X 2.8 m (approximately) meant probably for chief priest of the monastery. The front (east) fagade of the monastery has decoration like recesses and projections in the wall. There are total fifteen cells measuring 3 X 4 m (approximately) alike. Sanctum facing south-east (4.1 X 3.1 m) has been exposed.

As a sequel to this year's excavation comparatively a small elliptical mound in front of modern *matha* and adjacent to main road to the sculpture shed was taken up for digging which revealed traces of structural complex (Monastery 4) that appears to be a part of the monastery.

In the top most portion of the mound was encountered a partly exposed kerb of a courtyard of a monastery and evidence of the entrance doorway. In the trench ZQ 7 and ZQ 9, there are traces of cells of monastic establishments. Besides, the outer brick wall of the monastery with several offsets have been exposed partly. In the trench ZQ 9 of this monastic complex a huge plinth in stone having five offsets above which was traced a brick wall and an entrance. In the same trench was noticed atleast three phases of constructional activity in this area. The potsherds of lower most phase bear similarity with those of apsidal *chaityagriha* phase. An evidence of drain made of stone was also available from the upper most level of the area.

56. EXCAVATION AT MANAMUNDA, DISTRICT PHULBANI.— While confirming the stratigraphy of earlier excavation the present work done by the P.G. Department of History, Sambalpur University under the supervision of C.R. Mishra and S. Pradhan, yielded two phases of occupation, identified by two definite ash bands with a gap of 25 cm in-between. Black and red ware of the Megalithic fabric and the black polished and burnished ware constitute the main pottery types of the earliest phase of occupation of the site datable to the third-fourth centuries BC. The other important antiquities recovered from the excavations were microliths, beads of carnelian, coral, shell and rods besides a few terracotta elephant, bull and seals. Iron objects like axe, knife, spear-head, dagger, chisel, hinge and nails predominate the collection. The evidence from the excavation does not present a clear picture of the earliest occupational phase, as a result of which this settlement could not be assigned an exact period.

57. EXCAVATION AT GOLBAI SASAN, DISTRICT PURI.—The Excavation Branch IV of the Survey under the direction of B.K. Sinha, assisted by N.K. Sinha, P.N. Biswas, M.P. Singh, R.N. Sahoo, Bansi Behera of the Branch and I.M. Tikku and S. Chatterjee of the Headquarters office, undertook regular excavations at village Golbai Sasan (20° 01' N ; 83° 33' 5' E) in continuation of trial excavation conducted earlier *(1990-91,* pp. 55-57).

In all 7 trenches were dug up and an undisturbed cultural deposit of about 8 m was noticed above the natural soil. Study of materials, obtained from the excavations, showed the existence of two periods i.e., Period I and II. Period II was further subdivided into Period IIA and Period II B.

Period I Neolithic

Period IIA Chalcolithic

Period II B Chalcolithic period, showing some degeneration and evidence of iron.

The deposit of Period I rested directly over the natural soil and had a thickness of about one metre. Excavations in the deposit of this period, were limited to a very small area comprising of the layers which were separated by a deposit of compact clay having thickness of 1.80 m from the succeeding period. In the upper levels of this period, a structure of shapeless stone on a bed of rammed clay was found. No tools were met with in this period, but some worked bone pieces were noticed. Pottery recovered from this period is hand-made, on slow wheel or turn tables and in a few cases wheel-made. The hand-made pottery shows cord or reed impression as well as tortoise shell impressions. The wares are coarse dull red ware and grey ware. The shapes are represented by vases of different sizes.

Overlying this deposit of Period I and separated from it by a 1 -80 m thick deposit of compact clay, was found a 5 m thick deposit consisting of fourteen layers. This deposit yielded evidence of

Chalcolithic period. An area of 175 sqm was exposed in seven trenches. Rich cultural remains were met with in this period which included tools on stone, bone, copper and objects of bone, terracotta and faience. Polished stone tools consisted of celts, adzes, shouldered celts, saddle querns and one tool edge polisher (pl. XLVIII A). Bone tools were both polished and upolished, crude and developed ones made on bones of humped cattle, sheep and antlers. Tool types were points, burins, chisel, digging tools, adze, needle, long points or spears (27 cm in length), blades, denticulated blades, arrowheads and single row harpoons (pls. XLVIII B, XLIX and L). Discovery of adze on semi-mineralised bone is the only one reported so far from Chalcolithic sites in India. Other bone objects consisted of earstuds and pendants (pi. LI A). Terracotta objects consisted of spindle-whorls (pl. LI B), sling balls and one crude human figurine ? Copper objects (pl. LII A) consisted of chisel, bangle, rings and a fishhook. Small beads of faience were also recovered. In the upper layers of this period one headless skeleton with a copper bangle on the right wrist and portion below the knee missing, was also found.

The pottery recovered was both hand-made as well as wheel-made representing black and red ware (unpainted), dull red ware, burnished black, burnished chocolate, and burnished red ware (akin to Jorwe ware). A unique find was the presence of a good number of straight-sided miniature pots of clay having a height of 5 cm. These miniature pots were perhaps, used as crucibles for smelting copper or some other precious metal.

Shapes in black and red ware were of bowls and tumblers with dice-cut bases. Shapes in other wares included *katoras,* vases, bowls with out-curved sides and carinated base, dishes, lids, jars and dish-on-stand. Some pots of burnished chocolate ware showed post-firing paintings in red ochre. The painted designs consisted of oblique and vertical strokes and hatched triangles.

Circular huts with post-holes and hearths were noticed in the lower levels of this period. A total of thirteen huts, varying in diameter from 3-90 m to 7-90 m were met with. Stone pieces having mortices for tennons, found in excavations indicate that huts were equipped with doors.

The deposit belonging to Period II B was confined to the top 3 layers i.e., layers, (3) to (1), with a depth of little over 1 m. Material recovered from this period, visibly, was not different from that of the preceeding period, but it showed only a slight degeneration. The most important discovery of this period was however, an iron celt, which appears to be a copy of the stone celts. A close examination of the iron celt shows that the knowledge of iron was very primitive and some crude methods of extraction of iron from the ore was known. The celt is not moulded and has been beaten into shape (pl. LII B).

Animal remains from different levels show the evidence of humped cattle, goat, deer, *eliphas maximus, bovidae* and *capra hiccus aegegisus.* Presence of rice, *mong* and *kulth* were detected from the collected samples.

Eleven carbon sampes collected from various levels in the Chalcolithic period have been sent for C-14 dating. Results of analysis of these samples are yet to be recieved.

58. EXPLORATION IN DISTRICT PURI.— N.K. Sinha and M.P. Singh of the Excavation Branch IV of the Survey, on information from Chandra Kant of village Kesowar, (19° 53' 22"; 85° 24' 40") presently known as Baspadar, explored the area around the village and noticed small mounds. Some of these are still under cultivation. Potsherds were found scattered on the surface of the mounds as well as in the cultivated fields.

Pottery picked up from the site consisted of red-slipped ware, black and red ware, dull gritty red ware and coarse black pottery. The shapes met with are vases, dish-on-stand, spouts and bowls. Some pieces of sturdy hand-made basin with applique and finger-tipped designs were also picked up along with fragments of terracotta ring-wells.

Terracotta objects such as earstuds, mould of earstuds, one arecanut bead and a piece of pestle are among the other finds. The terracotta ear-studs bear a close similarity with those found during excavations at Sisupalgarh, i.e., type I of Period III and type V of Period II B.

A wall of kiln burnt-bricks (40 X 24 X 5 cm), was also seen.

Some microlithic tools were also collected by B.K. Sinha of Excavation Branch IV from a site on the left bank of river Mandakini, about 300 m west to the mound Mali Dipa in the village Golbai Sasan (20° 01'45"; 85° 33" 22").

A good number of flakes, fluted core and microliths of non-geometric type on quartz, quartzite, chert and agate were picked up from the surface. The potsherds collected from the site consist of rims of vases, treated with a wash. Incised decorations are also noticed on the rim of the potsherds. It could not be confirmed, if the pottery and microlithic tools, are contemporary.

On information from the Department of Anthropology, Utkal University, B.K. Sinha also examined the mound situated on the right bank of Khatiari Nala, a tributary of river Mandakini in village Gopalpur (20° 01' 52"; 85° 21' 19"). Part of the mound has been eroded by the Khatiari Nala providing a cliff section of the mound. Deposits consisting of ash layers were visible in this section. Portion of the mound is under cultivation.

The potsherds collected from the site consist of red burnished ware, dull red ware, red-slipped ware and one sherd of coarse black and red ware. The pottery is made on slow wheel. Main shapes are vases, basins and a tumbler.

Rib bone and mandible of cattle, one charred antler and a crude point on charred bone, etc. were found from the site. The remains appear to belong to the Chalcolithic period.

59. EXCAVATION AT NRUSIMHANATH, DISTRICT SAMBALPUR.— The Postgraduate Department of History, Sambalpur University conducted excavations at Nrusimhanath under the supervision of S.C. Panda and S. Pradhan, which is situated at the fringe of the mountain Gandhamardan in Padampur tehsil of Sambalpur district, is a famous religious and tourist centre because of its medieval temple and its presiding Vaisnavite deity *Marjara-Kesari* (lion-cat) standing picturesquely on the left bank of the *Papaharana nalla.* Scholars like G.R. Bhandarkar, J.D. Beglar, Charles Fabri, Binayak Mishra, T.E. Donaldson have dealt with the different aspects of art, architecture, inscription and date of the temple but never reached any definite conclusion about the antiquity of Nrusimhanath.

The small trial excavation was confined to an area of 5m X 5 m near the main gate in front of the *bhogagriha* to uncover the material remains of an earlier period. The excavation upto the depth of 1-25 m yielded four layers, a burnt-brick-paved floor with post-holes, brick alignments of small chambes running into the section and a very delicately carved mutilated image of Vishnu lying over a

boulder packing. The image recovered from a depth of 1.10 m was carved in round in red sandstone, is devoid of head, showing only a pair of right hand, right foot, left leg, and the attributes. But the presence of *yajnopavita, vaijayantimala,* waist cloth, and the butt of the mace leave little doubt for its identification as the image of Vishnu of a high artistic order that may be stylistically dated to the eighth-ninth centuries AD. The brick measuring 33 X 22 X 7 cm with their alignments suggest the existence of either an earlier temple or of a monastery of much earlier period than that of the medieval temple under worship now.

60. EXPLORATION IN DISTRICT SUNDARGARH.— Sadasiba Pradhan of P.G. Department of History, Sambalpur University reported the discovery of a cluster of rockshelters near the village Giripur situated at a distance of 6 km from Hemgir Road Railway station. The rock shelter locally known as Tongo is adorned with more than two hundred and fifty specimens of painting executed on its back wall at approachable heights. The engravings featured a group of geometric patterns, female genitals (triangles with or without a central line or a hole), rhombic patterns, and a variety of engimatic alphabetic forms. Originally the engravings were filled in with a paste of ochre as visible in the groves. The painting in ochre shows a female genital with wavy line decorations in white in the borders and the centre. Rock shelter yielded microliths such as blade, crescents, points and burin alongwith a few specimens of hand-made pottery from the surface exploration.

PONDICHERRY

61. EXCAVATIONS AT ARIKAMEDU.PONDICHERRY.—The joint lndo-U.S. archaeological investigations at Arikamedu were resumed by Vimala Begley of the University Museum, University of Pennsylvania and K.V. Raman of Madras University. Amongst members of the American team were Steven E. Sidebotham, University of Delaware, Elizabeth Lyding Will, Amherst College, Kathleen Warner Slane, University of Missouri, and Peter Francis, Jr., Center for Bead Research.

Although the primary focus of this season was the Southern Sector, Trench AV 91-VII, initially laid out in the previous season in the Northern Sector, was reopened and excavated below water level. In the western part of the trench was the juncture of two large brick walls forming the southeastern corner of a substantial structure dating shortly after the period of c. 20 BC to AD 20 and more or less contemporary with the adjacent ring-well visible in the southern baulk. The walls run parallel to the southern and eastern walls of the "warehouse" excavated by Mortimer Wheeler in 1945. At lower levels, in central and southeastern parts of the trench, was a sizeable quantity of animal bones associated with sherds of coarse brownish-grey ware with white slip, "rouletted ware", and Koan amphora pieces of *c.* first century BC. Deposits in these lower loci were relatively undisturbed and form the basis for defining relative chronological sequences for the first centrury BC and early first century AD in this part of the site.

In the Southern Sector six trenches, five measuring 5 m square and one 8 X 3 m, were laid out along the water front, north of Sir Mortimer Wheeler's AK IV for the purpose of understanding how space was utilized all along the river. Structural remains, including a tank with drainage outlet and floors and walls of different phases, were encountered in all excavated areas of the trenches, indicating that the entire wafer front in the Southern Sector was occupied in ancient times; they also confirm J.M. Casal's

findings that earliest settlement in the Southern Sector was of people who used the so-called "megalithic" pottery. "Megalithic" graffiti was found on numerous pottery sherds including an *in situ* conical jar of Wheeler's Type 75, placed directly in the sand in the lowest loci of Trench AV92-XV. Although several pottery forms and fabrics overlap in the Northern and Southern Sectors, and both sectors yielded Mediterranean amphora and terra sigillata sherds, there is striking difference in the pottery assemblages of the two sectors, implying that different areas of the site were perhaps settled by different ethnic groups.

As in the north, the Southern Sector also showed signs of drastic disturbances and reutilization of ancient architectural remains in later time. Several thousand examples of broken roof tiles as well as a few complete examples (pi. Lin A) were recovered. In architecture several new constructional features were noticed, such as use of roof tiles as chinking material and post-firing secondary holes in the bricks (pl. LIII B), probably for supporting wooden or bamboo posts at a later date. The dates of the disturbances, or history of the site after the first century AD, are yet to be determined, but there is ample evidence in the finds, specially in the Southern Sector, of a settlement and overseas commerce during medieval Chola times. Not only are there sherds of Chinese celadon and Islamic blue glazed pottery, but several domestic pottery forms and fabrics are certainly medieval. A careful separation of these sherds from the ancient, and identification of the loci with which they are associated is under way.

Artifacts found during the excavations include a square copper coin, a gold divider, probably from a four strand necklace, a fragmentary coconut pendant or disc, numerous finished and unfinished lapidary pieces, and glass beads and wasters. Pictorial graffiti occurs on a few sherds of fine ware. Amongst Mediterranean imports are over one hundred sherds of Mediterranean amphoras, a fragmentary sigillata cup, and a piece of a ribbed blue glass bowl.

PUNJAB

62. EXCAVATIONS AT BRASS, DISTRICT PATIALA.—In continuation of last year' s *(1990-91*, p.59)work, the Department of Cultural Affairs, Archaeology and Museums, Punjab, resumed excavations at ancient mound of Brass, under the supervision of K.K. Rishi, Kuldeep Singh, assisted by Gurdev Singh and Heera Singh. The objectives of the current year's excavations were to ascertain the cultural horizon of the area and to know about the cultural and socio-economic conditions during the Kushanas, besides ascertaining the relationship between the Painted Grey Ware and late Harappan cultures. For this purpose, the trenches of 10x10 m were laid out near the last year's excavated trenches. During the excavations the following sequence of culture was noticed.

i) Late Harappan,

ii) Painted Grey Ware and Greyware,

iii) Kushana, and

iv) Medieval

Though the virgin soil was not touched in any of the quadrants excavated during the current year, but a few sherds of late-Harappa culture alongwith PGW and grey ware sherds were collected from the earlier two layers, i.e., 24 and 23 of the trench D 1, Qd 3. Some sherds of late-Harappa period were

recovered from the trial trench laid out on the western side of the mound, where cutting due to water erosion is in progress. From this site, structural activities of other periods were also noticed. More details of this culture could not be collected. From the shapes of the sherds, it appears that there was a cultural horizon of the late-Harappans.

In trench El layer (4) to (7) some structures of Kushana period were also unearthed. Burnt brick (32 X 23 X 5 cm) have been used in these structures. In trench E1 Qd 1 three parallel walls of burnt-bricks, 34 cm wide were exposed. The distance from wall to wall is 1.34 cm. These are sealed by layer (4). As these structures were destroyed by brick robbers and pits, only four courses of these structures could be noticed. The orientation of these walls is north-east and south-west. A *kacchha* brick wall (57 cm wide) towards east connecting three walls was exposed. This wall is in north-south orientation. The extentions of these structures were also noticed in other quadrants. The exact nature of these structures could not be ascertained as area of the excavation was limited. Some portions of a well underneath a Kushana structure was also noticed in trench E1 Qd. 2. Wedge-shaped bricks measuring 42 X 23.5 X 19 X 5 cm have been used in this well. Floors of brick-bats and *surkhi* were also noticed.

The antiquities recovered from this period include copper coins, balls, earstuds, gamesmen, stamps, seals and sealings and iron objects etc.

During the excavations an inscribed sherd in Kharoshthi script was also recovered from layer (4) in trench E 1 Qd. 1. Layers (4) to (7) yielded large quantity of Kushana ceramics. The shapes include incurved bowls, mat-impressed vessels, carinated cooking vessels, basins, dishes, miniature pots and storage jars, etc.

The medieval period is represented by the presence of knife-edged bowls and incense burners, glazed sherds, *lota* and cooking vessels, etc. Some structures of brick-bats of this period were also noticed in trench A 1 Qd. 2 in which 8 layers of this period were exposed. In other trenches only three layers yielding medieval pottery were excavated. Some antiquities of this period were also recovered during the excavations comprising terracotta objects like balls, animal figurines, earstuds, gamesmen, wheels, bangles, bone stylus, glass bangle pieces, etc.

63. EXCAVATIONS AT DHOLBAHA, DISTRICT HOSHIARPUR.— Work of scientific clearance around two state protected Hindu temples built over sub-mountains at Dholbaha, a village 28 km towards north of the district Hoshiarpur was undertaken with a view to exposing complete plan of both the temples, their architectural details and nature of the temples; as also to ascertain its probable date.

The village Dholbaha is spreadover small Shiwalik hills (Tatrot formations). Fragments of ancient sculptures, pottery and stone blocks are found on many of these hills indicating that there must have been a big town in the past. During explorations, pottery belonging to the Kushana, Gupta, medieval and late medieval times was also picked up from different places. Interestingly Hindu sculptures of Pratihara period from the site and its vicinity have added historical importance to the region. The work of clearance was undertaken at two temple sites situated on two different hill tops. These two sites were named DLB-1 and DLB-2.

To expose all the extensions of the partially buried temple built in sandstone blocks, the site DLB-1 was properly surveyed and ten trenches (10x10 m) were laid north-south. *Sikhara* and body of

the temple is not there and only plan of the temple upto floor level exits. The work of exposing plan of the temple was confined to the buried extensions of the temple, only partial plan of the temple was exposed.

The *vastu* of the temple is square *(caturasri karana).* Plinth type could not be ascertained as no intact portions of outer walls survive above the ground level. The method of construction used in this building is dry masonry. Huge and small stone blocks have been kept in position by means of their weight and balance, supported by a system of interlocking flanges, so that no mortar or binding material is used. Outer wall of the main shrine was exposed on outerside as well as on the inner side in trenches ZA-1, Qd 4 and B-l, Qd 1. It was noticed that the wall which is 3.73 m high and 2.20 m wide consists of gravels, rough sandstones on the inner side and stone blocks on the outer side. The inner side of the total plan was dug upto the base level which consists of three courses of quartzite pebbles, gravels and rough stones. The upper most course is of fine gravels and pebbles. Total thickness of the terrace from base level (inner side) upto floor level is 3.20 m. All the main walls and pillars of the shrine are made up of stone blocks cut carefully in two sizes, while the inner spaces have been filled with rough stones and gravels, etc., at places where heavy weight was to be worn. Yellow clay has been used as a binding material. In the interspaces between the walls and pillars and outer solid structures raised from base upto floor level have been packed with alternate layers of sand, *surkhi,* sand and earth, sand mixed with *surkhi,* gravels, sand and clay etc., in trench ZA-1. Eleven such layers were noticed in-between the interspaces. Pottery comprise mainly the sharp-edged rims and base of the bowls which were recovered from all these layers. This was probably done to absorb shocks of tremor and at places, only where no heavy weight was put over it. Huge blocks of sandstones, sculptured panels, fragmentary sculptures were recovered from the ghost walls which have been robbed off by block seekers. Plan of the ruined shrine show that it had entrance on four sides and had a covered *sandhara* circuit around the cells. Recovery of many pillars which are of two types indicate that exterior *pradakshina (sandhara* circuit) had pillars so that sun light may be there all around in the shrine. On the basis of plan, iconographical details and the pottery recovered from the layers inside the shrine, the temple could be assignable to *circa* fourteenth century AD. No other important antiquities have been recovered. Sculptures represent both Saivite and Vaishnavite deities. No inscription could be recovered during the scientific clearance.

Scientific clearance was undertaken at another protected temple site (DLB-2), built of sandstone, situated on a hill top. A trench A-l (10 X 10 m) was laid to expose adjoining extensions of the temple built of dressed stones. Debris around the temple was removed systematically upto the plinth level. No extensions were noticed in any direction, plinth is of 4.08 X 2.28 m. The temple is rectangular in shape, having *garbha-griha* only. Entrance is towards East. There are two *dvarapalas* on either side whose identification could not be ascertained due to the absence of details. No other sculpture was traceable either inside or outside. The image was also missing though there existed a stone slab on which the image must have been enshrined. A path built of stone leading to the temple was noticed towards north-west. Pottery recovered from the disturbed strata all around upto the plinth level belonged to Muslim period only. Bowls having sharp edges and cooking vessels, etc., indicate that the shrine must have been built around the sixteenth century. No inscription was recovered.

RAJASTHAN

64. EXPLORATION IN DISTRICT BHARATPUR.— During the course of village-to-village survey Kanwar Singh of Jaipur Circle of the Survey discovered the following sites of archaeological interest.

Tehsil	*Village*	*Nature of remains*

Bayana	Boriyapura (26°50'25"N;77°15'35"E)	Remains of Early medieval temple
Rupbas	Boroli Brahman (26^{o}59'50"N;77`71'E)	Medieval pottery
-do-	Dumariyan (26°55'20"N; 77°25'45"E)	Remains of about 250 years old residential complex
-do-	Gahanoli (27^{o}02'25"N; 77°32'E)	*Chhatri (circa* seventeenth centrury)
-do-	Khanua (27°02'N; 77°338E)	Group of *chhatris* and a *baradari* (Mughal period)
-do-	Odelgaddi (27°01'30"N;77°34'E)	Mosque of Mughal period

65. EXPLORATION IN DISTRICT DHAULPUR.— C.L. Suri assisted by I.D. Diwedi, G.S. Gaur, L.S. Mamani, V.P. Verma, Vinod Kumar and others of Excavation Branch II of the Survey carried out exploration in District Dhaulpur, and reported a number of sites with cultural contents ranging from Late Stone Age to the medieval period which are listed below.

Tehsil	Village/Site	Nature of remains
Bari	Aruna Ka Khera (26^{0}43’00”N; 77^{0}45’15”E)	Medieval
-do-	Atiraj Ka Pura (26^{0}33’45”N; 77^{0}43’25”E)	Early medieval
-do-	Bari (26^{0}39’00”N; 77^{0}37’00”E)	Painted Grey Ware, early medieval
-do-	Bill Pur (26^{0}47’15”N; 77^{0}53’15”E)	Early medieval

Tehsil	*Village/Site*	*Nature of remains*
Ban	Bhoj Pur (26°46' 00" N; 77°52' 00" E)	Early medieval
-do-	Dhauns Pur (26° 42' 00" N; 77° 40[1]54" E)	Medieval
-do-	Dhonder Khera (26°42' 00" N; 77°42' 45" E)	Black and red, PGW, black-slipped ware, early historical and medieval
-do-	Dhurwas (26°46'42"N;77°41'27"E)	Medieval
-do-	Garhi Lajja (26°48' 32" N; 77°42' 30" E)	Medieval
-do-	Hansai (26°47' 52" N; 77°40' 00" E)	Microlithic, PGW, Black and red, NBP and black-slipped ware
-do-	Jatoli (26°44' 30" N; 77°56' 15" E)	Historical (early medieval)
-do-	Khapraila (26°49' 08" N; 77°43' 52" E)	Medieval
-do-	Kolwa (Kolwa) (26°46'18"N;77°49'23"E)	Black and red, Painted Grey Ware and medieval
-do-	Kukra (26°49' 15"N;77°43'22"E)	Medieval
-do-	Laloni Har (26° 43' 22" N; 77° 45" 05" E)	Medieval
-do-	Mania (26°49' 44" N; 77°55' 07" E)	Medieval
-do-	Maloni (26°46 55" N; 77°55' 22" E)	Early historical

Tehsil	*Village/Site*	*Nature of remains*
Ban	Mishra Ka Pura (26°33' 25" N; 78°48' 00" E)	Early historical
-do-	Nand Ka Pura (26° 45' 28" N; 77° 45' 22" E)	Mesolithic, early medieval
-do-	Pabesara Ka Khera (26°43' 20" N; 77°40' 30" E)	Medieval
-do-	Ulwati (26° 41'07" N; 77° 40'03" E)	Medieval
Baseri (Sepau)	Chaura Khera (26° 47'25" N; 77° 48'15" E)	Early medieval
-do-	Gouli (26°51'15"N;77°40'00"E)	Medieval
-do-	Gulaoli (26°47'52" N; 77°40'00" E)	Medieval
Dhaulpur	Allah Pura (26'44'45"N;77°53'28"E)	Medieval
-do-	Babu Ka Than (26°45[1]32"N;77°51[1]30"E)	Early medieval
-do-	Bareh Mori (26°45' 32" N; 77°37' 00" E)	Medieval
-do-	Bhainsakh (26°42' 48" N; 77°55' 44" E)	Early medieval
-do-	Bhainsena (26°42' 52" N; 77°59' 12" E)	Medieval
-do-	Bhainsena Ka Pura (26°43'46"N; 77°57' 30" E)	Medieval

Tehsil	*Village/Site*	*Nature of remains*
Dhaulpur	Nagar (near temple) (26°33' 15" N; 77°47' 30" E)	Painted Grey Ware, Black and red ware
-do-	Ondela (26°44'00" N;77°52'-22"E)	Medieval
-do-	Rajaura Khurd (26°43" 20" N; 77°40' 30" E)	Early historical
-do-	Sepau (26°49' 00" N; 77°45' 00" E)	Painted Grey Ware, black-slipped ware, medieval
-do-	Shergarh Fort (26°40' 13" N; 77*54' 15" E)	Medieval
-do-	Solaha Khumba (26°42'12"N;76°55'07"E)	Historical (early medieval)
-do-	Tighra (26°41' 57" N; 77°59' 12" E)	Historical (early medieval)
-do-	Tori Daniel (26°41'57"N;77'54'55"E)	Microlithic, early medieval
Raja Khera	Dihauli (26°46>30"N;78°01'43"E)	Medieval
-do-	Faras Pura (26°46' 58" N; 78°03' 15" E)	Medieval
-do-	Karka Khilli (26°46' 20" N; 78°02' 09" E)	Microliths, Painted Grey Ware and medieval black and red pottery
-do-	Maraina Ke Khera (26°48' 00" N; 78°02' 22" E)	Early historical

TAMILNADU

66. EXPLORATION IN DISTRICT COIMBATORE — A.K. Sharma, assisted by K.M. Girhe, N.K. Nimje, P.V. Janardhanan and C.L. Yadav of the Prehistory Branch of the Survey, inspected a site (11° 9' N; 77° 13' E) at village Tekkalur on the left bank of a small river Vannathankarai, about 43 km from

Coimbatore on Coimbatore-Salem road. This site is extremely rich in calcined faunal remains mostly of herbivorous animals such as deer, stag, sheep, goat and a few of cattle deposited in patches over the granitic boulders. Majority of the bones bear cut marks and are partially or fully charred, which suggest that the site was probably a butchering-cum-roasting spot of the people who lived nearby. Close to this site, evidence of human habitation in the form of fire places, pounders and pestles have also been noticed. A little downstream of this site, cairn-circles were available which are now wiped out due to extensive cultivation.

67. EXPLORATION IN DISTRICT TIRUVANNAMALAI-SAMBUVARAYAR.— K.S. Sampath of the Pre historic Branch of the Department of Archaeology, Government of Tamil Nadu explored Tiruvannamalai-Sambuvarayar district, during the period under review. The exploration in the hillocks of adjoining Panniyur revealed pre-historic paintings in white and red ochre. Line drawings found here mainly depict animals. Of these paintings, an animal rider is, however, noteworthy. Besides, megalithic burial, cairn-circles, etc., were also found at Olaipadai and Pakkakottai (Ramarajapettai).

TRIPURA

68. EXPLORATION AT UNAKOTI, DISTRICT NORTH TRIPURA.— D. Bhengra of the Gauhati Circle of the Survey assisted by T.J. Baidya, S.K. Choudhary, P.M. Das and T.K. Srivastava during the course of exploration at Unakoti hill range, discovered stone sculptures of Siva-Parvati, four-armed female deities, torso of a pot-bellied figure, numerous fragmentary sculptures, *yoni-pitha,* door-jambs; female head of terracotta besides a few architectural pieces and the remains of brick structures, ring-well, etc. Also noteworthy is a beautifully carved massive block of stone, adorned with lotus pendants, beaded borders and four pairs of coiled snake represented in four directions. Another interesting discovery is that of the mud rampart wall, habitation mound and a huge tank at Rangawooti.

UTTAR PRADESH

69. EXCAVATION AT SADHWARA, DISTRICT AGRA.— The Agra Circle of the Survey carried out a small scale excavation at Sadhwara Khera (27° 1" N; 78° 2' 30" E) in village Inayatpur under the direction of Shankar Nath assisted by P.B.S. Sengar, C.P. Singh, G.N. Srivastava, O.D. Shukla, S.K. Jain, Y.K. Sharma and others.

The site is situated on the left bank of an old dried bed of river Khari though present course of the river is about 3 km further south. The excavation revealed remains of: OCP, PGW and black-and-red ware, early historical and, medieval period.

An occupational deposit of 4.35 m thickness was encountered from the excavation at the topmost contours of the mound. The whole deposit consisted of nine layers (1 to 8 A). The layer (8 A) was lying immediately above the natural formation of yellow clay which revealed a few sherds of OCP mainly represented by the vase. The presence of a thin uniform layer of ash, suggest conflagration at this occupational level. The layer (8) had an assemblage of PGW and plain grey ware alongwith red ware of same fabric and black-and-red ware. The notable antiquity from the PGW deposit is an antler. It was noticed that a groove was cut around the base of this antler suggesting the captivation of that animal by lying it with some strung. The layer (7) was marked by the occurrence of few fine sherds of NBPW, however, the common types consisted of red ware of coarse and medium fabric and coarse grey ware.

Besides, a few sherds of black-slipped ware were also found. From layer (6) were encountered sherds of red ware and the most noteworthy is a type of bowl with incurved rim. Layer (5) marked the beginning of medieval period with the characteristic pottery type showing button-knobed-lid. In the early historical and medieval deposits terracotta objects and beads of semiprecious stones were found (pi. LIV). The copper coin found from the top layer appears to be of Sultanate period.

70. EXPLORATION IN DISTRICT ALLAHABAD.— V.D. Mishra, J.N. Pandey and J.N. Pal of the Department of Ancient History, Culture and Archaeology, University of Allahabad, located a mesolithic site in village Nibi Kalan in Phoolpur sub-division. Microlithic tools and waste material of chert and chalcedony were collected from the site.

An extensive NBP site was also located in village Sarai Raja on the right bank of Bakulahi river in Soraon sub-division of Allahabad.

71. EXCAVATION AT JAINAL-NAULA, DISTRICT ALMORA.— The Department of History including Ancient Indian History, Culture and Archaeology, H.N.B. Garhwal University, carried out excavation at Jainal-Naula under the direction of K.P. Nautiyal, assisted by B.M. Khanduri, Vinod Nautiyal, R.C. Bhatt, D.L. Rajput, Y.S. Farswan, IS. Rawat, J.S. Negi, K.S. Negi and G.P.Bahuguna.

The ancient site of Jainal-Naula is situated on the right bank of Ramganga in the Almora District. The entire stretch spreading over an area of 32 km from Chaukhutia Ganai to Bhikiyasen yielded good results with burials all along the course of Ramganga. During the period under review the excavation was conducted at Baseri falling in the Jainal-Naula complex, located at a distance of 8 km northwards of Bhikyasen. The excavation brought to light two types of burials, i.e., dolmenoid cist and urn burials. Three cist burials BSR-5, BSR-6 and BSR 7 were excavated and it was noticed that all the cists at this place were virtually hanging on the river section, which stands roughly 30 m from the present flood plain.

The present excavation revealed cists with three or four long orthostats placed vertically according to the requirement. Ail the chambers were rectangular on plan with a required number of cap stones covering the box-like structure. The cist measured variously between 2.32 m X 0.50 m and l.34m X O.58m which contained pots, skulls and human bones. Most of the cist burials were placed in east-west direction while a few others were laid in north-south direction. Atleast seven pots of various sizes, shapes and fabrics were discovered from the excavation.

The most significant discovery of the excavation in BSR-5 is a preserved human skeletal remains which seemed to have been placed in a very peculiar position in which the disarticulated bones of skull, femur, tibia-fibula, jaw (upper and lower), tooth and other bones were kept separately.

Another characteristic find of Baseri comprise a group of urn burials. The large-sized jars (38 cm diameter) contained prominent ripple marks on the outer surface. The urn burial was protected from all sides by a dressed and round stone wall. Such urn burials were also found near the cist burials as recorded from BSR-5 and BSR-7.

The pottery from the excavation is the same as found in previous year's excavation. Most of the shapes of the pots are akin to the PG W types reported from Hastinapura, Ahichchhatra, Jakhera, Thapli and other PGW sites, where the PGW sherds along with a variety of red ware, display prominent designs.

The evidence from Baseri in Kumaon has shown a new phenomenon of two different cultural traits Megalithic and PGW deeply intermingling.

On the basis of archaeological evidence, *viz.,* skull, femur, tooths, jaw, pottery along with the PGW traditions, these burials from Kumaon can be tentatively placed around the beginning of the first millennium BC.

The skeletal material and the soil matrix surrounding it has been collected from the excavation. This would subsequently be taken up for analytical studies.

72. EXCAVATION AT LADYURA, DISTRICT ALMORA.— The Prehistory Branch of the Survey, under the direction of A.K. Sharma, assisted by S.B. Ota, R.K. Dwivedi, Rajbir Singh, C.L. Yadav and P.C. Dogra undertook the excavation of Megalithic cists at village Ladyura (30° 35' N; 80°35' E). The site is located on a terrace between two perennial streams where a large number of cists are buried below lateritic clay of 1 to 2 m thick depending on the undulating surface. Two such cists partly exposed on the road cuttings were taken up for excavation.

Cists of different sizes and shapes are found along the valleys and terraces in Kumaon region. They normally comprise of 3 to 4 orthostats kept in erect position by cutting a pit generally in the shale bedrock and covered with a single or more than one stone slab. In some places these cists have more than one compartments. From these cists occasionally funerary goods in the form of wheel-made earthen pots of different shapes and sizes, such as *handis,* basins, bowls with stubbed legs and pedestalled bowls alongwith pieces of iron and fragmentary human bones have been recovered. The pottery is generally red and grey ware made of gritty clay without slip but having only a wash of self same clay solution. Unfortunately, these stray finds of funerary equipments are neither well documented nor preserved anywhere.

All the available cists have been erected inside the pits cut into the shale bed-rock. They are oriented north-south lengthwise and vary in size. Most of the cists are having only one compartment but few with more than one compartments are also available. They are simple rectangular structures open in the south, composed of a number of dressed shale slabs. The southern end is always open.

The cists were erected inside the grave pit cut into the shale bed-rock. One of the U-shaped grave pit is 0-80 m deep, 1.90 m long and 0.80 m wide at the top and 0-55 m wide at the bottom. The upright orthostats have been made to stand erect by fixing their lower edges (lengthwise) in the grooves (channels) that have been cut into the bed-rock. The remaining space between the upright margins and groove margins has been packed with chips of stones. Normally the channels have been so cut that their width tally with the thickness of uprights facilitating easy insertion and erection of uprights. The grooves are not very deep. The uprights have been covered with capstones that runs throughout the length of the cist. The capstone is normally the biggest and projects laterally on all sides across the top edges of the orthostats. Normally the northern end of the cist has been blocked by a single upright. The lateral ends of the rear (northern) orthostat would, almost invariably, never stretch out across the edges of the side orthostats, but rest firmly against them. On the sides in this case two uprights each have been erected. The second capstone of the southern end is missing. The cist is 1.84 m in length, 0.53 m in width and 0.45 m in height and has been filled with self same material obtained by cutting the pit. One of the capstone recovered is 1 m length and 0.64 m in width.

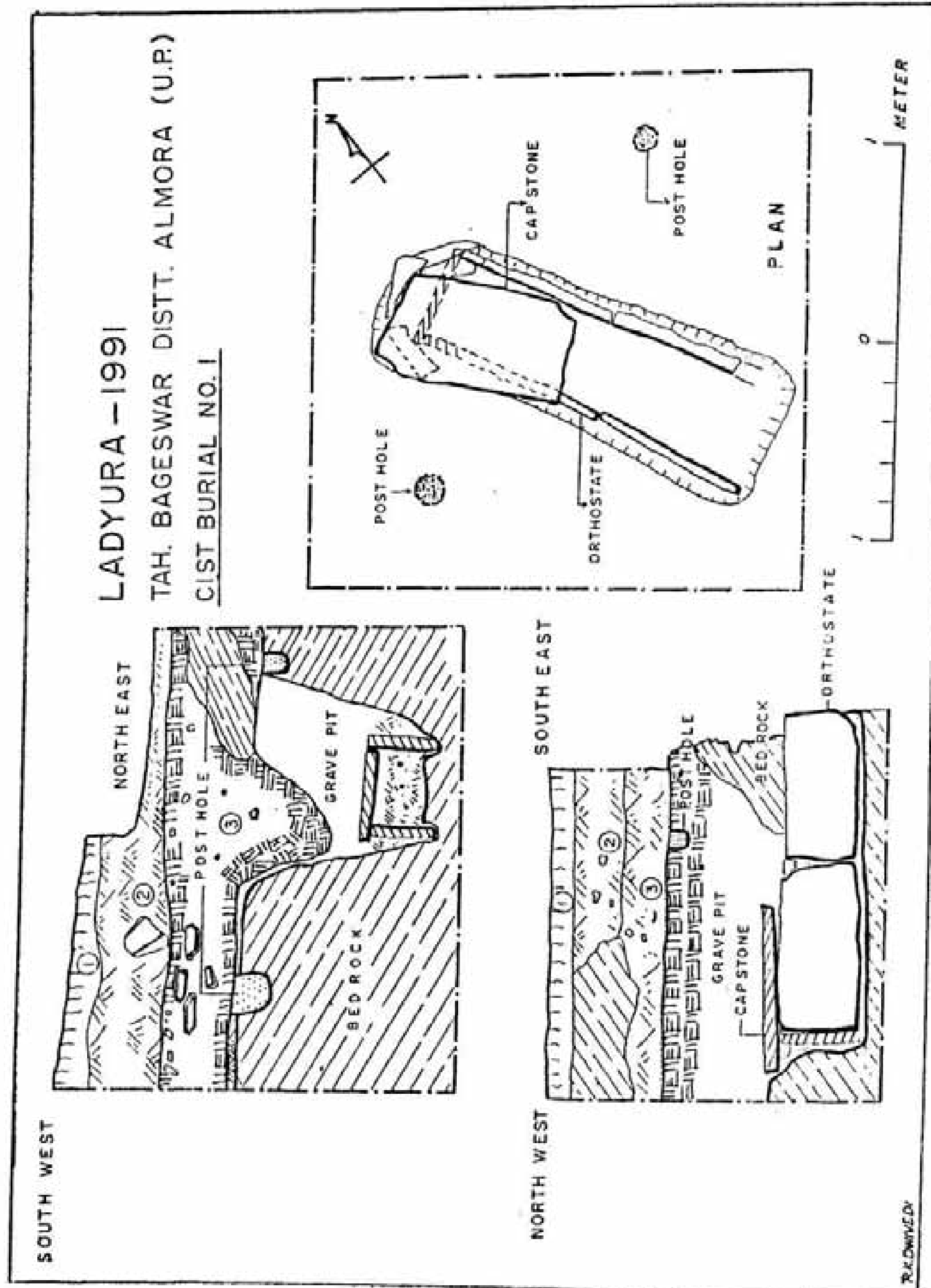

LADYURA – 1991
TAH. BAGESWAR DISTT. ALMORA (U.P.)
CIST BURIAL NO. I
SOUTH WEST
NORTH EAST
POST HOLE
GRAVE PIT
BED ROCK
NORTH WEST
SOUTH EAST
POST HOLE
BED ROCK
GRAVE PIT
CAP STONE
ORTHOSTATE
POST HOLE
ORTHOSTATE
CAP STONE
POST HOLE
PLAN
METER
R.K.DWIVEDI

Fig. 20

The most interesting feature of these cist burials is the presence of post-holes on both the sides (eastern and western) of the grave pit. Two post-holes, one on the east and the other in the west of the cist were found during the excavation (0.16 m and 0.13 m respectively). As they are located almost at equidistant from the upright orthostats of their respective sides one on the northwestern end and the other on the southeastern end of the cist. There is every possibility that similar, atleast two post-holes might have been there one on the southwestern and the other on the north-eastern sides of the cists. These post-holes have also been sunk in the bed-rock. The presence of the post-holes indicate that after the internment of the mortal remains and other funerary goods, and after filling the pit, a conical shade supported atleast by four uprights (two on each side) and one central beam was erected over the burial. This is a novel feature recorded for the first time.

Tiny fragments of human bones were recovered from one of the cists.

Only fragments of iron objects of indeterminate shape were recovered from the cists. This is due to highly corrosive and acidic nature of the overlying lateritic deposit and excessive rainfall.

Pottery from cist (1) are mostly coarse red ware and with thick section, wheel-made and ill-fired. Mat impressions occur on the outer surface. In few cases red slip is noticed on the outer surface. Besides, it also yielded wheel-made grey ware with medium fabric and thick section. These were prepared out of partially levigated clay and fired in reduction condition.

Black ware from cist (2) comprise only bowl with featureless rim of fine fabric, convex sides and thin section. These are wheel-made, prepared out of well levigated clay and fired in reduction condition.

In case of burial 1 (fig. 20) there are three overlying layers whereas in case of burial 2, there are five overlying layers.

Thickness of this topmost layer varies from burial to burial as stated above. It is of recent origin, composed of fine loose silt under constant process of erosion and deposition.

Layer (2) is the thickest of all the layers, comprises fine reddish clay which is not so compact. The thickness varies from 0-15 m to 0-40 m indicating heavy erosional and depositional activity during this period, which was probably the result of large scale deforestation in the area.

Layer (3) is not uniformly thick throughout but varies from 0.25 m to 0.45 m. It is composed of red, hard silt mixed with medium size quartz and quartzite noduls.

Layer (4) uniformly thick (0.40 m) found in burial 2, comprised of decomposed rock material mixed with tiny pieces of quartz and slate. The soil is red compact clay, very hard when dry but disintegrates easily when wet. The thickness and composition of this layer indicates that heavy erosional activity from the higher reaches took place during the period of deposition. The heavy rainfall and resulting erosion of exposed disintegrated bed-rock due to deforestation, exposed underlying quartz nodules.

The 0.20 m thick layer (5) available in burial 2 is mostly composed of weathered rock material washed down the slopes. This comparatively thin deposit indicates that during this period there was heavy vegetational cover in the area, and erosional activity was not intense.

On the basis of the pottery recovered from these burials, these could be dated to around first-second century BC. This is tentative till the results of TL dating are available.

Fortunately in the area of Koormand and Bechandhar, which are located near the confluence of Ramganga and Kauravgand rivers, on the right bank of the former and on the left bank of the later a number of cist burials are located. Grave pits for these cists have been cut into the last aggredational deposits of the two rivers and have been filled with the self same material. At Bechandhar right over the filling of the grave pits and also over the last aggredational deposit there is a later habitational deposit of nearly 1 m, yielding fine red wares very similar to Kushana pottery. This evidence also supports the date suggested above.

73. EXPLORATION IN SRAVASTI, DISTRICT BAHRAICH.— In collaboration with the Kansai University, Osaka, Japan and Excavation Branch in of the Survey, Patna explored Maheth area of Sravasti under the direction of Y. Aboshi assisted by T.Tanji, F. Yoneda, M. Hayashi, T. Hirooka, A. Uesugi, H, Oya, and Sharad Pandya (co-ordinator on behalf of Kansai University team) and L.C. Singh, assisted by D.K. Ambastha of the Branch. In order to select the area for excavation in 1992-93, the Suraj Kund area and a conspicuous mound in the northern part of the site was put to a thorough topographical survey. In addition the extant height of the rampart at some points was also measured. In the Main area, there are conspicuous mound around the pond, at which brickbats are scattered and the corners of the foundation of structure are exposed on the surface of the mounds. In second area, the mound is isolated from other mounds and is covered with partly expectably on the slopes/edges.

Looking over the current conditions around the Main area, a swamp, which was referred to as Kaira tal in the report of J. Ph. Vogel, is spreading from south-west to south of the main area at the time of survey. Judging from conditions of distribution of water plant, the swamp is to be found to the west and to be linked to the west part of second area in rainy season. In other words, it appears that the Main area is enclosed by a swamp from south to west. To the east, level ground is continued to the rampart, where brick walls are exposed and numerous fragments of pottery are scattered.

To the west, the existence of the Kaira tal which prevent any structure from being constructed makes impossible conditions indicating any structural remains.

Within the Main area, the Suraj Kund, which means 'the pond of sun' is enclosed by some mounds. In dry season at the time of survey the pond shows ellipsoidal shape measuring 32 m in longer axis and 28 m in the shorter, and the water level is situated around the contour of 194.25 m. It is surmised from the location of water plants that the water level may rise to 195.00 m in rainy seasons. In general, it measures 5 m in comparative height from the water level to the top of a highest mound. Though, in the present, it cannot be made clear whether this pond by natural formation or artificial one, this arrangement possibly shows that this pond contained meanigfully in the location of structures in the area, so it may be possible that some artificial equipment was constructed with the pond.

As to the remarks on topographical features, the area is divided into four quardrants with tentative numbers M1-M4 to the mounds around the pond respectively.

In quadrant A two mounds can be recognized both of which are situated to the south of the pond, one (M4) being long belt-shaped curved towards south-east and the other (M3) being adjacent to the

western part of the former. There is a rise on the northern part of M4, measuring 200-237 m at the highest point. The highest point of M3 reaches to 200-417 m, is the highest point in which the Main area.

M4 proceeds to east, then intersected by depression, turned south for about 50 m. On the eastern part of this mound forms a gentle slope, another slope is continued to the mounds outside the excavation area. In the south-east corner of the excavated area, an unnatural condition which is observed indicates possibility of existence of some structural remains.

If this observation is correct, this can be considered as one of the southern extremities in the excavated area.

M3 is the most conspicuous one in the Main area and measures 2 m. It forms oval shape, measuring about 20 m long north-south and about 12 m in east-west. On the slope of the mound, a line of burnt-bricks are exposed, and to the east of the mound, another line of burnt bricks, which appears to be a basement of structure, was recognizable before clearance. This may be linked to M4 to the east. There are two spots where contour lines are running in oblong shape. Moreover, the contour lines could be seen running straight in the north-western parts, and this should imply an embedding conditions of structural remains.

In quadrant X no notable feature could be marked excepting the gentle slope that continued from the southern part of quadrant Y. And, there is no indication of structural remains also. This might be due to exclude any danger of flood in Kaira tal during rainy season by constructing structures with some distances from the Kaira tal. At any rate, there is no evidence showing the existence of any structure to the west of quadrant.

In quadrant Y, two mounds (M1/M2) are located. At the highest point, Ml measures 198-408 m from sea level and M2 measures 198-837 m, and they are lower than M3 and M4 by 1.5 to 2 m. Brickbats are scattered from top to bottom. These mounds are linked to each other at the points down from its top by 1 to 1-5 m. On the northern side, can be seen apart of slight depression of belt-shape continued from quadrant Z, which is supposed to be a drainage system described below. This depression is disappearing when it proceeds to the west gradually. Though not included for excavation, after the felling, a conspicuous mound (M5) was found at the distance of 150 m to the north of Al which is supposed to be gate remains of stupa.

There is no conspicuous mound in quadrant Z. In the north-west there 's a circular depression of 50 m in diameter measuring 1 m in depth. A slight belt-shaped depression vas found originating from the circular one westwards, might suggest a drainage system. There is also a Surip-like lowland between two small mounds to the north-east of the circular depression, indicating the existence of a raceway to the Suraj Kund. The other parts of this quadrant is flat grounds or gentle slope, and are raised to the northeast corner gradually.

The second area was not clear at the time of topographical survey. It is situated about 160 m from the foot of north rampart and about 90 m from west wall, and a point of YJ 25 is located on the top of this mound. In other words, its centre point is located 55 m to the west and 250 m to the north of Al. In the rainy season, a pool called Kairatal is formed to the west and north of the mound, and the water

level is likely to rise to 194 m. Judging from a map of Vogel, this pool is to be linked to Kaira tal to the west of the Main area.

On the west of the top of this mound small edifice was found. According to the local inhabitants, this is scralings, erected in recent time. This was constructed by burnt bricks with plaster on surface with a height of 1-8 m square and 1-5 m. It constituted a square basement in the lower part and is roughly conical in the upper part. Though a pan of a brick structure (above 198-500 m) to the north of the *linga* has been exposed, its nature, however, could not ascertained.

Numerous pottery fragments are scattered over the flat part on contour line of 196-00 m in the western part of the mound. These were mainly represented by red wares, although fragments of blackish pottery (NBP or grey ware) were also encountered, possibly deposited at the time of establishment and enlargement of stupa. The antiquities comprise mainly the terracotta and stone heads besides a fairly good number of terracotta balls. There is a depression of 3 m in diameter on the north-west of this mound, which was perhaps an old well according to the local inhabitants.

74. EXPLORATION IN DISTRICTS BAHRAICH AND FATEHPUR.— J.N. Pandey of the Department of Ancient History, Culture and Archaeology, Allahabad University collected early historical pottery, terracottas and other antiquities from Chanda-ka-Qila and Biduri in district Bahraich. The ceramic assemblage ranged from late Northern Black Polished period to Kushana period. Another early historic site was also explored at Shahpur Rara in Sadar Tehsil of Fatehpur district, which is situated at a distance of about 146 km west of Allahabad. Terracotta human figurines of the Kushana period and other antiquities were collected from the site.

75. EXPLORATIONS IN DISTRICT BAREILLY.— The Department of Ancient History and Culture, Rohilkhand University, Bareilly, under the supervision of U.P. Arora, assisted by R.P. Yadava, K.P. Singh, A.K. Sinha, Abhay Kumar Singh and O.P. Sharma in the course of exploration reported the discovery of following archaeological sites in the district.

Fatehganj west on Bareilly - Moradabad - Delhi National Highway No. 24, about 20 km from Bareilly was noticed an extensive mound. It is located in-between a rivulet Sankha and a river Baghool, covering an area of 5 acres. This site revealed sherds of PGW, black-and-red ware and black-slipped ware. The main shapes are bowls and dishes of different size and shapes. The painted motifs consist of concentric circles, loops, sigma and geometric designs. The black-and-red ware of Kushana period was also found. The common shapes include sprinklers, jars, vases, cups, carinated *handis,* troughs, basins and storage jars. Red ware cups with or without base or pedestal and lid with central knob were also noticed. Few pieces of red ware have painted black bands, besides nail impressions on the rim of a jar. On the basis of ceramic evidence, the possible date of earliest habitation of the site could be around the middle of the first millennium BC.

At Teehar Kheda on the bank of river Baghool, about 3 km south/south-west of Fatehganj west were noticed bowls and dishes of grey ware alongwith the sherds of black and red ware from a mound on the bank of river Baghool. The common shapes are bowls, jars, troughs, basins and storage jars. A red ware jar is noteworthy for its four leaf-shaped stamped designs. Few terracotta figurines were also recovered from the site. The habitation could be dated from the middle of the first millennium BC to the nineteenth century AD.

Another remarkable find is that of a fragmentary sculpture of Batuka-Bhairava in grey stone, assignable to ninth-tenth century AD, which is now preserved in the Panchala Museum of the Department.

A farmer while ploughing the northern portion of the mound, at Kharasani situated 5 km north of Fatehganj west on the road to Shahi reported the discovery of bricks of Gupta period indicating the presence of residential structures hidden underneath. Terracotta figurines of Gupta workmanship and cylindrical beads were also found. Other finds from the site comprise mainly red storage jars, dish-on-stand with short stem, and lids of various sizes and shapes, occasionally bearing traces of red slip and nail impression. All these evidences corroborate a date of third century BC for the habitation.

Another site reported by the University is at Unchagaon, situated 8 km about south-south-west of Bareilly town, which is mentioned as Unchagaon Mahgavan in the nineteenth century revenue records. This relates to *Mahagrama* of the Ramayana and *Majhgavan* of the Pali texts.

The site covering approximately an area of 1 -5 km is under cultivation which revealed bone arrow-heads, stone implements and a human skeleton earlier. The sherds of grey ware, black and red ware of Gupta period were collected in plenty during exploration. The main shapes of Kushana pottery include sprinklers, jars, bowls, carinated *handis* and lids with central knob. Besides, pottery, terracotta human and animal figurines, clay seals, one (2.5 X 2 cm) with a horse and a legend *Asvaghosasya* inscribed in Brahmi letters recovered from the site, are now preserved in the Panchala Museum of the Department.

Kadarganj located about 11 km south-east of Bareilly town in Faridpur tehsil, at the confluence of two rivers Nakatiya and Ramganga covering approximately an area of 15 hectares, is traditionally associated with the local rulers as the nuns of a Rohila fortress would indicate. A variety of pottery types, *viz.,* grey ware, NBP and red ware besides six fragmentary sprinklers, five pieces of red ware jar and vases decorated with incised stamped designs were recovered. Other objects collected from the site include potter's dabber, hopscotch, two human heads and fragmentary animal figurines of terracotta.

The explorations of two mounds in village Sainthal, covering almost 20 acres, 28 km from Bareilly city near Hafizganj, Nawabganj tehsil, on Bareilly - Pilibhit road, revealed sherds of PGW, NBP, red ware and black-and-red ware. The important shapes include bowls, dishes, jars, sprinklers and lids with central knob. A glazed ware sherd of medieval period was also recovered. Besides, a structure possibly the base of some commemorating pillar with niches on all sides was also noticed. The site appears to have been under occupation from the first millenium BC to the twelfth-thirteenth century AD.

From village Billauri Kheda in Aonla tehsil on Bareilly-Badaun highway about 28 km from the city of Bareilly were collected antiquities mostly belonging to the Kushana period. Black-and-red ware and red ware are the major pottery types. Apart from sprinklers, bowls, storage jars, high-necked jars with flaring and drooping rims, the carinated *handis* with nail impressions on the rims comprise the main shapes. A few animal and human figurines in terracotta were also recovered from the site.

The mound at Pachawni, on Bareilly-Lucknow National Highway no. 24, in tehsil Faridpur, about 25 km from Bareilly city, is partially occupied for residential and agricultural purposes. The mound which cover 2 km area, revealed sherds of grey, black-and-red and red wares. Most of the antiquities belong to the Kushana period including carinated *handis* with soot-marks, five pieces of pedestalled

cups, ring-based bowl with black-slip; globular jars, troughs, vases and bowls of red ware. Another notable find is a terracotta animal figurine possibly of a caprisoned horse.

Another site, village Rahtuiya in the vicinity of river Aril and Ahichchhatra, about one km north of Aonla Railway station, approximately 40 km away from Bareilly town where 10 m high mound is spread over an area of about one km square. Significant finds from the site comprise sherds of grey ware with designs painted in black colour. The shapes in PGW are, however, restricted to bowls and dishes. Also noreworthy are a few late NBP potsherds of degenerate type alongwith the sherds of black and red ware and the shapes like jars, troughs, basins recovered from the site and cooking vessels, etc., besides sprinklers, bowls and cups of Kushana period and fragmentary terracotta objects possibly of Gupta period.

The Department of Ancient History and Culture, Rohilkhand University, Bareilly during the course of exploration of a seven m high mound at Parsakhera approximately having an area of (150 X100 m) on Bareilly-Delhi National Highway no. 24 revealed sherds of grey ware, painted red ware of Kushana type, along with a few terracotta beads. The mound is situated at a distance of 12 km from the town of Bareilly.

76. EXPLORATION IN DISTRICTS BASTI AND GORAKHPUR.- In continuation of the previous year's work Rakesh Kumar Srivastava and K.K. Singh of the Uttar Pradesh State Archaeological Organisation, Lucknow, under the direction of Rakesh Tewari resumed explorations in Ami Valley, located in districts Basti and Gorakhpur.

The river Ami emerges from the Sikahratal which is situated in district Siddharthanagar and meets river Rapti in Gorakhpur district at the confluence of these rivers, where the well known Chalcolithic site Sohgaura is located. The exploration in question was started to get an idea about the expansion of this culture in Ami Valley.

During the course of exploration four sites Nagwan, Chandidiha, Hardidih and Ursara were located with probability of having Chalcolithic deposits. All these sites situated near the banks of the river, yielded sherds of plain black and red ware. Besides, sherds of Northern Black Polished ware, black-slipped ware and other wares have also been found. Following is the list of the explored archaeological sites.

District	*Tehsil*	*Site*	*Nature of remains*
Basti	Khalilabad	Bakarganj	NBPW, black-slipped ware, grey ware and red ware
-do-	-do-	Chandidih	Black-and-red ware, NBPW, black-sliped ware and red ware
-do-		Urasara	Black-and red ware, black-slipped ware, red ware, grey ware and glazed ware
-do-	Rudhanli	Rudhauli	Black-slipped ware, NBPW and red ware

District	*Tehsil*	*Site*	*Nature of remains*
Gorakhpur	Bansgaon	Hardidih	Black-and-red ware, red ware and grey ware
-do-	-do-	Kusha Tal	Black-and-red ware, grey ware and red ware
-do-	-do-	Lalpur	Red ware
-do-	-do-	Sarya Tewari	Late medieval sculpture
-do-	Gorakhpur	Nagwan	Black-and-red ware, black-slipped ware, NBPW, grey ware and red ware
-do-	Khajani	Deuapar	Red ware
-do-	Khajani	Mahanpar	Red ware

77. EXPLORATION IN DISTRICT BIJNOR.— N.K. Singh of Agra Circle of the Survey noticed the following sites in course of village-to-village survey.

Tehsil	*Village*	*Nature of remains*
Dhampur	Dugri	Mound with sherds of OCW and red ware of Kushana period
-do-	Jallalpur	Mound with red ware of medieval period
-do-	Kashmiri	Mound with sherds of OCW, grey ware
-do-	Khajuri	Mound with sherds of grey ware and associated red ware and red ware of Sunga and Kushana period
Dhampur	Mindru	Medieval mosque of *lakhauri* bricks
-do-	Nasirpur	Mosque built of *lakhauri* brick, sixteenth century AD
-do-	Nethor	*Lakhauri* brick tomb, fifteenth century AD
-do-	Padla	Mound with red ware of medieval period
-do-	Sadruddin Nagar	*Lakhauri* brick temple, sixteenth century AD
-do-	Sikandarpur	Temple of *lakhauri* bricks, seventeenth century AD
-do-	Sikri Khurd	Temple of *lakhauri* bricks, seventeenth century AD
-do-	Tibri	Temple built of *lakhauri* bricks, eighteenth century AD

78. EXCAVATION AT IMLIDIH KHURD, DISTRICT GORAKHPUR.— The Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi under the direction of Purushottam Singh assisted by Ravindranath Singh, Ashok Kumar Singh and Indrajeet Singh carried out a small-scale excavation at Imlidih Khurd (26° 30' 30"; 83° 12' 5") to ascertain the cultural sequence

and to see the westward extension of Narhan culture, discovered at the type site *(1985-86,* pp. 81-82). This ancient settlement located on the left bank of the Kuwana river, a tributary of the Ghaghara, is one of a cluster of three sites of Narhan culture, the other two being Sikri-dih and Jaddu Patti. Twenty-two 3 metre square trenches were excavated of which seventeen were dug upto the natural soil. This excavation resulted into a three-fold culture sequence:

Period I (pre-1300 BC) represented by an average deposit of about 50 cm was marked by profusion of a kind of hand-made cord-impressed pottery associated with plain red ware. The main . types in the cord-impressed ware comprise pedestalled bowl with incurved rim with cord-impressed patterns on the exterior and a slipped and heavily burnished interior. The height of the complete bowl is 7 cm and the diameter of the rim is 16 cm. A close examination revealed that the pedestal of such bowls was made separately, presumably on wheel and it was affixed to the body of the vessel. Similarliy, the rim was made separately and attached to the body of the vessel. The second type of vessel is the vase with a flaring rim, constricted neck and expanding sides, making a globular/pear-shaped body. This vessel bears cord-impressed designs just below the neck and all over the exterior. The third type of vessel is *handi-like* vase with out-turned or flaring rim, and expanding body just below the neck and a sharp carination at the waist which has been occasionally decorated with applique strip of clay bearing rope pattern, finger-nail pattern and chain pattern. This type of vessel bears cord-impressed patterns below the carinated waist on the exterior which has a sagger base. This vessel has a small spout luted at the shoulder. Some of the vessels of this period are painted and decorated with dots and dashes in creamish red colour over a red surface and by post-firing incised geometrical patterns.

The inhabitants of Period I lived in wattle-and-daub huts represented by reed marks in large numbers. Several floors made of mud, oven and *chulah* marked other structural activities. The small finds comprise several micro-beads of steatite, other beads of terracotta, agate and faience, bone points and pottery discs.

A tentative taxonomic classification of faunal remains done by Umesh Chandra Chattopadhyaya of the University of Allahabad shows that cattle, sheep/goat and presumably pig were domesticated. Among these, cattle remains predominated and often bear characteristic butchery marks. The wild ungulates comprise hog dear and a large canid, possibly wolf. The aquatic resources comprise two species of fresh water turtle, fish of small and medium size and fresh water mollusca. A good quantity of archaeological remains have been collected which are under study by K.S. Saraswat of Birbal Sahni Institute of Palaeobotany, Lucknow.

Period II (Narhan culture, *circa* 1300—800 BC) was marked by intense structural activity comprising of atleast two successive mud floors having several post-holes, furnaces and ovens. The characteristic pottery of this period consists of the white-painted black-and-red ware with such shapes as various types of bowls, dishes-on-stand and lipped-basins. This ware is well-documented at the type-site, located about 30 km east/south-east of the present site and it is the principal ceramic industry of this period. However, only coarse and medium fabrics of this ware are present and vessels of fine fabric are generally absent. Sherds of burnished black-and-red ware, comparatively rare at Narhan, are prolific

at Imlidih. In the black-slipped ware of this period an important typological addition is the *lota,* of which several specimens have been recorded, some of these bear painting on the exterior with vertical lines drawn from the rim down to the neck. The red-slipped ware recorded earlier from Narhan in limited quantity is totally absent at Imlidih.

The small finds from Period II comprise bone points, pottery discs, terracotta beads, a copper arrowhead and two copper beads. An important addition in the artistic repertoirs is the small beads of steatite, some of them exhibiting fine workmanship.

The faunal remains of Period II comprise domesticated cattle, goat/sheep, horses and dog. The wild fauna comprises boar, hog deer, *chital* or spotted dear and *barasingha* or swamp deer. As in Period I, the assemblage here is dominated by the cattle remains. The horse remains comprise a mandible with first and second pre-molars and an isolated molar/pre-molar. This animal, medium to large in size, is of domestic type and similar to those reported from Narhan culture and the Chalcolithic levels of Koldihwa. The aquatic resources of Period I except mollusca, reoccur in this level though in smaller concentration. Chicken seems to have contributed to the human diet.

79. EXPLORATION IN DISTRICT HARDWAR.— Suresh Singh of Agra Circle of the Survey noticed the following sites of Archaeological interest in the course of village-to-village survey.

Tehsil	*Village*	*Nature, of remains*
Laksar	Bahadarpur Khadar	Mosque (medieval)
-do-	Dausni	Temple (medieval)
-do-	Laksar	Temple (medieval)
-do-	Makhiali Khurd	Mosque(medieval)
-do-	Pachheoli	Temple (medieval)
-do-	Raipur	Mosque (medieval)
-do-	Sultanpur (Adampur)	Mosque (medieval)

80. EXCAVATION AT BANARSIHANKALAN, DISTRICT MAHARAJGANJ.— The Excavation Branch III of the Survey under the direction of L.C. Singh, undertook small scale excavation at Banarsihankalan (27° 18' N; 83° 16' E), tehsil Nautanwa. The site situated about 85 km north-west of Gorakhpur and extending more than 100 acres of land in east-west orientation, yielded a brick-built stupa. It is rectangular on plan developed in two sections ultimately integrated in one. The entire stupa has been raised in block, mostly with individual walls meeting with abutting joints. The inner core of the blocks have been filled up with rammed sticky alluvial soils brought from the nearby river site. The excavations revealed three phases of construction.

A late phase shrine exposed at the top in the northern side, is in east-west orientation. It is almost square on plan measuring 3-50 x 400 m, having a brick pedestal to install the image. A damaged stone head of an image and an animal were found *in situ* near the pedestal in course of the excavation, but

owing to its extreme fragile condition it could not be preserved. Heavy marks of burning was noticed. In its early phase, the stupa was built in two tiers. The plan of the upper tier of the stupa shows decoration with multiple sides at its south-east corner and north-west corner. A flight of steps from the east near the south-east corner, was provided to lead the upper terrace of the stupa. Only two individual walls of the third phase of construction were noticed. Antiquities found in the excavations comprise mostly terracotta objects like animal and human figurines, beads, balls, mould, sealings, etc. One small limestone head of Bodhisattva and a few coins comprise other finds. On the basis of antiquities found during excavations the site could probably be dated to Sunga-Kushana period, if not earlier.

Period III badly disturbed by present day agricultural activities in this part of the mound, is marked by the absence of black and red ware and a dominance of red ware. The frequency of black-slipped ware increased in this period. The other wares comprise a few sherds of grey ware. Besides, a solitary sherd of NBP was picked up from the surface. The cultural assemblage of this period is comparable to that of Period II of Narhan.

81. EXPLORATION IN DISTRICT SULTANPUR.— In the course of exploration under village-to- village survey Indu Prakash of the Lucknow Circle of the Survey noticed the following sites.

Tehsil	*Village*	*Nature of remains*
Musafirkhana	Dakhingaon	Mound yielding pottery ranging from early historical to medieval period; stone sculptures and architectural fragments of a ruined brick temple
-do-	Ekka Tajpur	Sculptural fragments of stone including one of *mithuna* figure, a male bust assignable to medieval period
-do-	Gayaspur	Mound yielding red ware sherds of medieval period
-do-	Harkhumau	Ruins of brick temple with a beautiful standing stone image of Surya assignable to ninth-tenth century AD
-do-	Kishni	Mound yielding medieval pottery and a stone sculpture of standing Vishnu assignable to tenth-eleventh century
do-	Lakhmipur	Fragmentary stone sculptures of early medieval period
do-	Majhgaon	Sculptural fragments of stone near a hamlet Palhi including a human head assignable to medieval period
do-	Mardanpur	Mound yielding red ware sherds of late medieval period

Tehsil	*Village*	*Nature of remains*
Musafirkhana	Pali	Mound yielding late medieval pottery; a nineteenth century temple dedicated to Siva
-do-	Palia	Mound yielding red ware sherds of medieval period
-do-	Rastamau	Small mound yielding red ware sherds of late medieval period
-do-	Unchgaon	Small mound yielding late medieval pottery, ruins of a brick temple with a *Siva-linga* and stone sculptures of Chamunda, Uma-Maheshvara, etc., assignable to early medieval period
-do-	Urwa	Mound yielding NBPW, black-slipped ware, Kushana and early medieval pottery

WEST BENGAL

82. EXPLORATION IN DISTRICT BANKURA.— Tapanjyoti Chakraborty of the Calcutta Circle of the Survey discovered the following ancient sites in the course of village-to-village survey.

Police Station	*Village/Site*	*Nature of remains*
Barjora	Mallara	Medieval temple Late
Katulpur	Dhanjoga	medieval temple Late
-do-	Govindapur	medieval temple Late
-do-	Hasandanga	medieval temple Late
-do-	Kankavati	medieval temple Late
-do-	Khundanga	medieval temple

83. EXPLORATION IN DISTRICT MIDNAPORE.— In the course of village-to village survey Santanu Maiti of the Calcutta Circle of the Survey discovered the following sites of archaeological interest.

Police Station	*Village/Site*	*Nature of remains*
Bhagwanpur	Bar Bhagwanpur	Late medieval temple
-do-	Bibhishanpur	Stone image of goddess Kali, brass image of devi Durga and ritual objects of metal

Police Station	*VillagelSite*	*Nature of remains*
Bhagwanpur	Gopinathpur	Temple (eighteenth-nineteenth century AD)
-do-	Ilashpur	Late medieval temple
-do-	Janadanri	Temple (eighteenth-nineteenth century AD)
-do-	Khajurari	Late medieval temple
-do-	Paikbheri	Late medieval temple
-do-	Paschim Tanguria	Late medieval temple
-do-	Purba Masuria	Late medieval temple
-do-	Shankarpur	Late medieval temple

84. EXPLORATION IN DISTRICT MIDNAPORE.— Atual Chandra Bhowmick of the Department of Museology, University of Calcutta explored Sahari (22° 37' 33" N; 86° 47' 44" E) situated about 3 km north-west of the Silda Market and nearly 2-5 km south-east of Belpahari which was highly eroded due to monsoon rains. The barren site about 1 m high covers an extensive area of about 1 sq km having maximum stretch on north-south direction. A *nullah* flows from its north-east corner towards north and meets the Dulong arising from the Thakuran *pahar,* ultimately meets the Subarnarekha river. In the course of exploration, two pear-shaped with broad, thick butt ends, five ovate and one cordiform Acheulean handaxes appeared to be the best, one ill-shaped cleaver, three scrapers, five bolas, weighing from 250 to 1250 gm, four points on flake with fine retouching are most outstanding. A good number of factory waste and two fluted cores were collected as surface finds in morainic deposits with occasional concentration on the exposed surface on northern portion of the site. The site necessitates resurvey for its potentiality, and to ascertain antiquity of the cultural complex and stratigraphy. These artefacts of the lower and middle palaeolithic periods, are found lying scattered on the higher elevated level as well on slope of the site, and the soil constituent is predominantly of ferruginous lateritic ingredient, and the formation appears to be complex; transported, secondary and reddish brown coloured. The surface of the site is flattish with slight undulation at places due to denudation in this cogy area. The site is strewn with quartz and quartzite small and big pieces lying scattered here and there. Quartz and Quartzite were utilized as raw materials for tools, and these are mostly light-brown patinated.

85. EXPLORATION IN DISTRICT 24-PARGANAS.— In the course of village-to-village survey Samar Ghosal of .Calcutta Circle of the Survey discovered the following sites of archaeological interest.

Police Station	*Village/Site*	*Nature of remains*
Diamon Harbour	Kuonda	Late medieval temple
-do-	Patdaha	Late medieval temple, stone image possibly of Surya
Kulpi	Bamanpore	Late historical stone image of Parsvanatha and wooden image of Bisalakshi

Police Station	*Village/Site*	*Nature of remains*
Kulpi	Bazar	Late medieval temple
-do-	Gumukhbera	Late medieval *Ras-mancha*
Mandirbazar	Changhari	Late medieval temple and mound
-do-	Uttar Jagadishpur	Late medieval temple

II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS[1]

ANDHRA PRADESH

1. TWO KANNADA INSCRIPTIONS, VENDICOLE, DISTRICT MEDAK.—Of the two Kannada inscriptions, on two different stones set up in the field outside the village, belonging to the Chalukya chief Irivabedemgadeva and dated Saka 939, Parabhava corresponding to AD 1017, the first one records the grant of lands at Vendikola by Bijjayyarasa to Soma-Jinalaya. The second inscription, registers the grant of lands at Vendikola by Gangayyarasa to the deity Ramesavaradeva of Polparela-tirtha. The gift was entrusted to the Jaina pontiff Vimalachandrapanditabhattaraka of Soma-Jinalaya, for the merit of Somayyarasa.

2. KAKATIYA INSCRIPTION, ATMAKUR, DISTRICT NALGONDA.— This Telugu inscription, engraved on a pillar set up in front of the Chennakesava temple, belongs to the reign of Kakatiya king Kumara Rudradeva (i.e., Pratapa Rudradeva). It is dated Saka 1212, Vikriti (AD 1290), and registers the grant of lands by the people of the village for the *amga-ramga-bhoga* of the deity Bhimanathadeva, consecrated at Atkur by the fore-fathers of Bhimadeva-maharaju, the father of *mahamandalesvara* Pemdlikoduku Maldeva-maharaju.

3. KAKATIYA INSCRIPTION, PATARLAPADU, DISTRICT NALGONDA.—This Telugu inscription, engraved on a pillar in a Siva temple outside the village, belongs to the reign of Kakatiya king Kumara Rudradevamaharaju (i.e., Pratapa Rudradeva). Dated Saka 1212, Vikritai (AD 1290), it registers the grant of lands as *vrittis* by Bhimadeva-maharaju, the father of *mahamandalesvara* Pemdlikoduku-Maldeva-maharaju, for the *amga-ramga-bhoga* of the deities Somanathadeva at Pamtarlapadu. It also refers to the remission of various taxes levied from different professional groups.

4. RASHTRAKUTA INSCRIPTION, PRODDATURU, DISTRICT NALGONDA.— This Kannada inscription, engraved on a pillar, set up infront of Ramalingesvarasvami temple, belongs to the reign of Rashtrakuta king Nityavarsha (i.e., Indra III). It refers to *mahasamanta* Nurmadidhavala and to his subordinate chief Gommarasa, who was administering Kollipaka nadu-7000 division. Dated Saka 835, Srimukha (AD 913), it registers the grant of several lands along with income from tax *siddhaya* by Chamangamunda,

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[1]lnformauon from : 1-4,7-9,13 16-26 and 28, K.V. Ramesh, assisted by Madhav N. Katti, M.D. Sampath, S.P. Tewari, S. Subramonia Iyer, N. Nanjundaswamy, D.M. Nagaraju, S. Nagarjuna, S. Swaminathan, K. Karuppaiah and S. Rajavelu of the Epigraphy Branch of the Survey, Mysore who found, examined and reported nearly 480 inscriptions of which the important ones are noticed here; and 12,14, Bhopal Circle and 15, Aurangabad Circle of the Survey; 5-6, Department of Archaeology, Government of Gujarat; 10-11, Directorate of Archaeology and Museums, Government of Kamataka; and 27, Department of Archaeology, Government of Tamil Nadu.

son of Aydamayya, to the temple raised by the former. Aydamayya is stated to have been ruling over Padaturu.

GUJARAT

5. STONE INSCRIPTION, JINAND KUND, DISTRICT SURENDRANAGAR.— An inscription datable to twelfth century AD was found from the Jinand Kund, located near Zinzuwada in the Surendranagar District. Engraved on a darkish green slate stone slab (measuring 49 x 83 x 5cm), this inscription is in Sanskrit verse and has total twenty lines. The inscription although partly damaged, refers to a Queen belonging to "Malwa Maharashtra" who is said to have constructed the pond for the benefit of the people. The inscription mentions further a name *shatrusalya* who could be an important dignitory.

6. COPPER-PLATE INSCRIPTION, DHANK, DISTRICT RAJKOT. — A copper-plate inscription belonging to the Maitraka rulers who ruled from Vallabhi, was found from the village Dhank. The copper-plate (10 kg) measures 40 x 35 cm and contains Brahmi inscription in Sanskrit language, datable to seventh century AD.

KARNATAKA

7. YADAVA INSCRIPTION, HABBALLI, DISTRICT GULBARGA.— This Kannada inscription, belonging to the reign of Yadava king Simganadeva, is dated Saka 1130, Vibhava (AD 1208). While the ruler was camping at Devagiri, his feudatory chiefs *mahamandalesvara* Chamdagidevarasa and *mahapradhana* Lakshmideva-dandanayaka were governing Ededore-2000 division. The record states that Bammarasa, Ayitarasa and Revarasa of Hotugal made grant of lands, measured by sixty-four feet span rod, for the daily worship, perpetual lamp and festivals to the three deities, *viz.,* Revanesvara, Gangesvara and Nagesvara. The gift was entrusted to one Nagarasi-panditadeva. Futher it also records the grant of lands outside the village.

8. KALYANA CHALUKYA INSCRIPTION, KULGERA, DISTRICT GULBARGA.—This Kannada inscription, engraved on a slab of Nagalingesvara temple, belongs to the reign of Kalyana Chalukya king Jagadekamalla. It is dated Saka 1187, Krodhana (AD 1265) and registers the grant of lands, house-site and oil-mill by several individuals to the deity Nagesvaradeva.

9. YADAVA INSCRIPTION, KULGERA, DISTRICT GULBARGA.— This Kannada inscription, engraved on a slab set up to the right of Nagalingesvara temple, belongs to the reign of Yadava king Mahadeva. It is dated Saka 1187 (AD 1265) and states that while he was camping at Devagiri, his chief Ganapatidevarasaru was governing Hagaradere-nadu. It is further stated that the latter, the *mahaprabhus* and the *mahajanas* are stated to have endowed lands to the deities Amritalimga-visaprahari, Nagesvara and Babbesvara of the *maha-ghatikasthana* at Kunilimgere, on the occasion of *Uttarayana-sankranti* and *amavasya.* The gift was entrusted to Somesvaradeva, the disciple of Mateyaladeva. It also registers the grant of lands, garden, oil-mill, etc., by Nagavarmma for the *amga-bhoga* and *ranga-bhoga* of the deity Nagesvaradeva.

10. KANNADA INSCRIPTION, MURUKINAHALLI, DISTRICT MANDYA.—This Kannada inscription dated in Saka 1052 Sadaharana samvatsara, pushya su. 13 belongs to the reign of Hoysala Visnuvardhana. It records the grant of land to the temple by Muddanna son of Rachashetti and Muddamma.

11. COPPER-PLATE INSCRIPTION, SORAB, DISTRICT SHIMOGA.—One copper-plate inscription, noticed at Suppugudde, records the grant of *dattis,* belongs to the reign of Sadasivanayaka.

MADHYA PRADESH

12. COPPER-PLATE INSCRIPTION, BAGH, DISTRICT DHAR.— A copper-plate inscription in Gupta Brahmi character was found at Bagh Cave, which records the excavation of the caves during the reign of Subandhu of Mahishmati (pl. LVA).

13. SANSKRIT INSCRIPTION, BILAHARA, DISTRICT NARASIMHAPUR.— This inscription, in Sanskrit (corrupt) language and Nagari script, is engraved on a slab lying in a field. Dated Vakrama 1374 (AD 1317), it refers to the reign of Sultan Qutab-uddin (Suratana Khudavadin) and to *sati* committed by a lady named Lonaide of the village Valahari.

14. VOTIVE INSCRIPTION, SANCHI, DISTRICT RAISEN.— Eight votive inscriptions in Sunga-Brahmi characters were found from the *pradakshinapatha* of Stupa2, recording the donation of stone slabs for lower *pradakshinapatha* (pi. LVB).

MAHARASHTRA

15. INSCRIPTIONS, CAVE 3, PITALKHORA, DISTRICT AURANGABAD.—During the course of inspection of Pitalkhora caves, seven painted and one inscribed inscriptions were found. The first seven inscriptions on palaeographical grounds range in date between second century and fourth-fifth century AD. While the last one, in Kaithi script gives a date in Saka samvat 1498 (AD 1576). These inscriptions in Sanskrit language are all donatory in nature as could be noticed from the primary reading: 1, *deva dharmmoya drasate tisho moni tangch yadatraponya; ma (tru) (pi) to purvangema krutva satvana (ma) nutura sukhena vaptavesa; 2, eya dharmmoya sakya bhikashu (bhir) bhasya (veer bhasya) yadatra punya sarvva satvana (ma) (no) ttara;* 3, *deya dharmmoya sakya bhikshu vvisnonama ....*; 4, Ilegible; 5, *chi ma la bha sa ha; 6, deya dharmmoya sakya bhikshu;* 7, *(de) dharmmoyata;* and 8, *saka,* (Saka samvat) 14 (9) 8 (in Kaithi Modiscript).

Three more inscriptions are found inscribed over the cell-door of vihara (Cave 4). These inscriptions are not quite legible but some of the letters can certainly be read and on palaeographical ground could be dated to 200-150 BC which are akin to Asokan Brahmi.

RAJASTHAN

16. SANSKRIT INSCRIPTION, DEVASOMANATH, DISTRICT DUNGARPUR.— This Sanskrit inscription, engraved on a pillar in the *mahamandapa* of the temple of Devasomanatha, is in Nagari characters. Dated Vikrama 1518 (AD 1461), it belongs to the reign of *Raula* Somadasa and records the erection of *kirtti-torana* probably in the temple of Somesvara.

17. SANSKRIT INSCRIPTION, DUNGARPUR, DISTRICT DUNGARPUR.— This Sanskrit record, in Siddhamatrika characters of eighth century AD is engraved on a slab preserved in the State Museum. A few of the verses are in praise of Siva and Parvati, while the rest eulogise some of the *Brahmanas,* who are well versed in *sruti* and *smriti,* to whom the donations were made by the brother of *Bhatta* Dronasvami at the time of performance of the sacrifice.

18. SANSKRIT INSCRIPTION, DUNGARPUR, DISTRICT DUNGARPUR.—This Sanskrit inscription, engraved on a slab preserved in the State Museum, is in Nagari characters. Dated Vikrama 1336 (AD 1279), the record belongs to the reign *of maharaja* Virasimhadeva. It mentions the bodies *mahajana* and *talavara.* The exact purport of the record is not clear.

19. SANSKRIT INSCRIPTION, DUNGARPUR, DISTRICT DUNGARPUR.—This inscription, found preserved in the State Museum, is in Sanskrit language mixed with local dialect and in Nagari characters. Dated Vikrama 1530 (AD 1473) and belonging to the reign of *Maharaula* Somadasa, it records the grant of lands, the details of which are not clear.

20. SANSKRIT INSCRIPTION, DUNGARPUR, DISTRICT DUNGARPUR.— This record, engraved on a slab built into the wall of Jnanesvara-mandir, is in Sanskrit language mixed with local dialect and in Nagari characters. Dated Vikrama 1813 and Saka 1678 (AD 1756), it traces the genealogy of the king *Maharaula* Sivasimha. It also records the construction of a *prasada* and the consecration of the deity Jnanesvara by the queen.

TAMIL NADU

21. TAMIL INSCRIPTIONS, PELUR, DISTRICT SALEM.— Of the two Tamil inscriptions, engraved on two different slabs set up near the lake *Sirreri,* the first one belongs to the reign of the Chola king Kulottunga. Dated in the forty-eight year (AD 1118) of his reign, the record states that a washerman named Pichchan Chokkan of Erivirapattanam got a sluice raised probably for the lake of the village included in Turavi-nadu in Miladu *alias* Jananatha-Valanadu.

The second record, in characters of twelfth century, records the construction of a sluice probably to the lake of the village by a washerwoman of Perayur in Turavi-nadu in Maladu *alias* Jananatha-valanadu.

22. TAMIL-BRAHMI INSCRIPTION, NAGANURPATTI, DISTRICT SOUTH ARCOT.— This record, engraved on a boulder, which forms the outer face of a rocky outcrop, locally called *Adukkuparai* in the above village, is in Tamil language and in Tamil-Brahmi script. The record may be assinged to second-third century AD on the basis of palaeography. It states that the cave *(palli)* was caused to be made by Uchekkantanni, the mother of Chekkanti of Perumpogal village.

23. PALLAVA INSCRIPTION, TIRUPPACHCHANUR, DISTRICT SOUTH ARCOT.—This inscription, engraved on a stone built into the steps of the Isvara temple, is in Tamil language and characters. Dated in the third year (AD 799) of the reign of the Pallava king Dantivarman, the inscription registers the gift of garden lands made after purchase to the *bhatarar* of Tiruppachchannallur.

24. TAMIL-BRAHMI INSCRIPTION, TONDUR, DISTRICT SOUTH ARCOT.—This inscription, engraved on the beds of the caves of Pasumalai hills near the above village, is in Tamil language and Tamil-Brahmi characters. The record may be assigned on palaeographic grounds to first-second century AD. It states that the beds were caused to be made by Mochi, as the donation of the villagers of Agal-ur, under the orders *(eva)* of Ilankayipan. The interesting feature of the inscription is the presence of dot *(pulli)* over the consonants.

25. TAMIL INSCRIPTION, VILLUPURAM, DISTRICT SOUTH ARCOT.— This inscription, engraved on a loose stone originally found from the village Arasalapuram, is now preserved in the P.W.D. office at

the above place. This inscription is in Tamil language and Vatteluttu characters of about the sixth century AD. It refers to the death of a cock *(koli)* in an encounter after an attack on Mugaiyur.

26. VUAYANAGARA INSCRIPTION, VIRACHOLAPURAM, DISTRICT SOUTH ARCOT.—This Tamil inscription, engraved on the north wall of the central shrine of Ardhanarisvara temple, belongs to the reign of Vijayanagara king Devaraya-maharaya, son of Mallikarjunaraya. Dated Saka 1396, Jaya (AD 1474), it refers to the orders *(tirumugam)* issued by Kandanarayanan Anandatandavapperumal Tondaimanar. It states that when the *parru* suffered from decay as a result of the lapses in the collection of taxes like *ottu, nattupadi, kadamai,* etc. as per the earlier privileges, an order was issued to the effect that these levies should be collected after reducing the value from two hundred to one hundred *pon.*

27. CHOLA INSCRIPTION, MARAGUNAM, DISTRICT TIRUVANNAMALAI SAMBUVARAYAR.— A ninth century inscription of Aditya I was found at Maragunam, which refers to the king as *'Vijaya Rajakesari'* and also records that the *urar* of this village (village *sabha)* gifted *uva ere* to an individual. The prefix *vijaya* mentioned with the name of the Chola king and the gift made as *uva ere* are interesting as these are recorded for the first time in this inscription.

UTTAR PRADESH

28. TWO BRAHMI INSCRIPTIONS, MATHURA, DISTRICT MATHURA.— These two inscriptions are now preserved in the Mathura museum. The language is a mixture of hybrid Prakrit and Sanskrit. The script employed is Brahmi of second century AD. The first record belongs to the reign of *maharaja-devaputra* Huvishka and is dated in the year 33, *Hemanta-masa* and *divasa 2.* It records the gift of a water pitcher *(kubhakam-toyiyam)* to an *acharya* of the Sarvastivadin sect by Budharakshita and Dharmarakshita, the sons of Soma belonging to the Opavana-sagotra and hailing from Takshasila. The second record, written on the pedestal of a *Siva-linga,* seems to refer to the installation (of the *linga)* on the fifth day in the month of *Grishma* in the year ninety-six.

ARABIC AND PERSIAN INSCRIPTIONS[1]

ANDHRA PRADESH

1. MISCELLANEOUS INSCRIPTIONS, GOLKONDA, DISTRICT HYDERABAD.— Of the four inscriptions found in the store-room of the Qutb Shahi tomb-complex, Golkonda, this epigraph, written in beautiful Thulth characters, contains the date in AH 1048 (AD 1673-74) and the name as Taqiu'd-Din Muhammad son of Salih al-Bahrani. The person mentioned in the record is the famous scribe of the time of Qutb Shahi ruler 'Abdullah Qutb Shah. His two more inscriptions were earlier noticed in *the Annual Reports of Indian Epigraphy 1968-69,* No. D-31 and *1976-77,* No. D-4.

2. MISCELLANEOUS INSCRIPTION, URLUGONDA, DISTRICT NALGONDA.—This Persian metrical record in beautiful Nasta 'liq style, found on the wall of a dilapidated structure refers to the construction of some magnificent place of worship, i.e., a mosque, in AH 1057 (AD 1647-48)

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[1] Information from: M.F. Khan, assisted by S.S. Hussain, M. Y. Quddusi, M.I. Quddusi, G.S. Khwaja and M.A. Siddiqi of the Epigraphy Branch of the Survey, Nagpur who copied, examined and reported seventy nine inscriptions during the year under review, out of which important ones are noticed here.

3. MISCELLANEOUS INSCRIPTION, PODILE, DISTRICT PRAKASAM.— Of the three inscriptions copied from Podile, this epigraph mentions the demise of Muhammad Kazim son of Haji-Urdubadi (in Iran) in AH 1000 (AD 1592).

GUJARAT

4. MISCELLANEOUS INSCRIPTIONS, GOTARKA, DISTRICT BANASKANTHA.— Of the three inscriptions found in Gotarka, the first states that Shah Hussain *alias* Mahabali who belongs to the descendants of Hadrat' Ali, the fourth Caliph of Islam, died in AH 1032 (AD 1622-23) and after his death his son, Shah Khidr who became his spiritual successor, died in AH 1048 (AD 1638-39). It further states that his tomb was built in 1063 (AD 1652-53). Another inscription from the same place, records the construction of tomb of Shah Gulab by his successor Jang 'Ali Shah in AH 1267 (AD 1850-51) at the cost of three thousand four-hundred and thirty-eight rupees. The third inscription records the construction of the mosque by Jang 'Ali Shah in AH 1272 (AD 1855-56).

5. INSCRIPTION OF SULTAN OF GUJARAT, PRANTU, DISTRICT SABARKANTHA.—This Arabic inscription on Pada mosque (pi. LVI), Prantij, written in beautiful Naskh style, is important as it records the construction of a mosque by al-Baramad a' 1-Khani during the governorship of Khan-a' 1-A 'zam Mubarak Khan son of Ahmad Shah Sultan in AH 844 (AD 1441).

ORISSA

6. MISCELLANEOUS INSCRIPTION, CUTTACK, DISTRICT CUTTACK.— This metrical record in Persian, executed in Nasta' liq characters, refers to the construction of an ablution tank *(hand)* in the mosque by Sayyid Mukarram 'Ali in the year AH 1328 (AD 1910-11).

7. MISCELLANEOUS INSCRIPTION, MASUMPUR, DISTRICT CUTTACK.—This epigraph, written in beautiful Nasta' liq in Persian, records the construction of a mosque by Maulavi Muhammad Hasan in AH 1229 (AD 1813-14). It also mentions the name of the composer as Khushtar.

8. MISCELLANEOUS INSCRIPTION, SUNGRA, DISTRICT CUTTACK.— This inscription records the construction of a mosque by 'Abdu' llah in AH 1244 (AD 1828-29). The text of the epigraph was composed by Husaini.

9. EPITAPH, VISHWANATHPUR, DISTRICT CUTTACK.— This Persian inscription records the construction of the tomb of a lady named Hanifatun-Nisa Begam daughter of Mir Khuda Vardi in AH 1150 (AD 1737-38) during the governorship of Nawwab Mahabat Jang. It further states that she was killed by the infidels at a place named Qama Darpan. The person mentioned in the record is no other than the eminent Nawwab Ali Vardi Khan entitled Mahabat Jang.

RAJASTHAN

10. MISCELLANEOUS INSCRIPTION, KETHUN, DISTRICT KOTAH.—This fragmentary and badly damaged epigraph found in the graveyard in Kethun is quite important as it relates to the Tughluq period. It states that someone (name not clear) departed from this world in AH 735 (AD 1334-35).

UTTAR PRADESH

11. MISCELLANEOUS INSCRIPTION, AGRA, DISTRICT AGRA.— This inscription is quite interesting as it is inscribed on the replica of fingers and palm *(panja)*. Dated in AH 1073 (AD 1662-63), it states that

whosoever gets sight of this (i.e., *panja),* his desires are fulfilled by God for the sake of Khwaja Mu 'inu 'd-Din Chishti (the celebrated saint who is buried in Ajmer). The other inscription from the same place records the construction of the mosque by Zulfi Sultan Bahadur Ghazi in AH 1106 (AD 1695). It further mentions that Mirza Sharif has composed the text of this record.

12. MISCELLANEOUS INSCRIPTIONS, BARABANKI, DISTRICT BARABANKI.— This Persian inscription executed in beautiful Nasta'liq, records the construction of a mosque by Shah Majnun in AH 965 (AD 1557-58). The other record also, from the same place, registers the demise of Maulavi Muhammad Salim-u'llah in AH 1305 (AD 1887-88).

13. INSCRIPTION OF NAWWAB OF AWADH, BARABANKI, DISTRICT BARABANKI.—This Persian epigraph, written in beautiful Nasta' liq, records the construction of a mosque in AH 1285 (AD 1868-69) by Wajid 'Ali Shah, the Nawwab of Awadh who was a good poet having nom-de-plume as Akhtar. The record is quite important as we do not get more lithic records of the rulers of Awadh.

14. MISCELLANEOUS INSCRIPTION, MASAULI, DISTRICT BARABANKI.—This is a dated seal, made of stone containing the date AH 1243 (AD 1827-28) and name of Sayyid Farzand Husain Khan Bahadur, a person of status of his time.

15. EPITHAPH, BIJNORE, DISTRICT LUCKNOW.—This record, lying loose in the mosque, registers the damise of Shaikh Mu'azzam in AH 1277 (AD 1860).

16. MISCELLANEOUS INSCRIPTIONS, MALIHABAD, DISTRICT LUCKNOW.— Of the two inscriptions found in Malihabad on the tomb, the first records the construction of a beautiful building, evidently the tomb, by Shamir Khan during his life time in AH 975 (AD 1567-68). The other inscription also in Persian and executed in Naskh style, states the untimely death of both the sons (name not given) in AH 975 (AD 1567-68).

17. MISCELLANEOUS INSCRIPTIONS, TIKAITGANJ, DISTRICT LUCKNOW.—These two inscriptions found on the bridge at Tikaitganj are quite important as they throw light on the work of public utility. Their purport is identical but dates are different. Of them, the first states that Raja Tikait Rai built bridge over the river Beta in AH 1200 (AD 1785-86). The other inscription, dated AH 1202 (AD 1787-88), is identical which suggests that construction of bridge commenced on the first date while it was completed on the second date.

18. MISCELLANEOUS INSCRIPTION, RAI BAREILY, DISTRICT RAI BAREILY.—This inscription found on 'Alamgiri Masjid records the construction of some edifice, may be the mosque, by Mirak Husain Musavi in AH 1098 (AD 1686-87).

WEST BENGAL

19. MISCELLANEOUS INSCRIPTIONS, MURSHIDABAD, DISTRICT MURSHIDABAD.— This epigraph found in the Imambara at Murshidabad refers to the construction of some mosque by Hai in AH 1137 (AD 1724-25). The other inscription from the same place fixed on Siva temple, records the construction of the *Mandil* (i.e., temple) by Mahtab Chand Chaudhari, son of Munna Chaudhari, in AH 1263 (AD 1858). The importance of this inscription lies in the fact that it throws light on the usage of Bengali era and Persian language which continued upto the nineteenth century.

III. NUMISMATICS AND TREASURE TROVE [1]

KARNATAKA

1. GOLD COINS, NELAMANGALA TALUK, DISTRICT BANGALORE.— Three gold coins Kantirayapanams of Mysore Rulers were acquired as treasure trove.

2. SILVER COINS, GOLD RING, BANGLES AND SILVERLUMP, BAILHONGAL TALUK, DISTRICT BELGAUM.— One hundred forty six silver coins, two gold rings, bangles and one silver lump were acquired as treasure trove. The coins belong to East India Company.

3. GOLD COINS, BIDAR, DISTRICT BIDAR.— Six gold coins, two of them belonging to the Vijayanagara period, three to the Bahamani period and the last one of the Portuguese times were discovered during digging for laying a pipe line at cross roads of Kusumagalli. They are now in the Police custody at Bidar.

4. GOLD AND SILVER COINS, BIDAR, DISTRICT BIDAR.—Two hundred twenty-five gold (pl. LVII) and seventeen silver coins were discovered while digging for laying a water pipe line in Subzh Tazia Gulli (street) of Pansal Taleem Mohalla of Bidar town. Out of two hundred twenty five gold coins, two hundred twenty two belong to Hari-Hara II (AD 1377-1404) and Devaraya I (AD 1406-22) of Sangama line of Vijayanagara dynasty. Out of three other gold coins, one belongs to Mohammed Shah I (AD 1358-1375) and two belong to Ala-ud-din Ahmad Shah H (AD 1435-1457) of Bahamani dynasty. Of the seventeen silver coins, two belong to Taj-ud-din Firoz Shah (AD 1397-1422) and the rest to Ala-ud-din Ahmad Shah II of the Bahamani dynasty.

5. GOLD COINS, BAGALAKOTE TALUK, DISTRICT BIJAPUR.— Eleven gold coins which were acquired as treasure trove belong to the Kadamba rulers of Banavasi and datable to eleventh and twelveth century AD.

6. SILVER COINS, MUDDEBIHAL TALUK, DISTRICT BIJAPUR.— Sixteen silver coins with Persian legend on both the sides were acquired as treasure trove.

7. SILVER COINS, NARASIMHARAJAPUR, DISTRICT CHIKMAGALUR.— Three silver coins belonging to the East India Company were acquired as treasure trove.

8. COINS, ORNAMENTS AND LAMP, CHITRADURGA TALUK, DISTRICT CHITRADURGA.— Thirty-two gold coins, eighteen ornaments and one lamp were acquired as treasure trove. Of these, gold coins are of Vijayanagara dynasty.

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[1] Information from: 1-2,5-11, Directorate of Archaeology and Museums, Karnataka; and 3-4, Hyderabad Circle and 12-13, Calcutta Circle of the Survey.

9. GOLD COINS AND SILVER OBJECTS, KARADIGE, MALAVALLI TALUK, DISTRICT MANDYA.— One hundred and twenty-eight gold coins and one silver object were acquired as treasure trove. Of these gold coins fifty-five *panams* belong to Mysore Wadiyars (Kantiraya *panams)* while seventy-three *panams* are of Thriruvankaru Raja (Thriruvankuru *panams).*

10. SILVER COINS, NAGAMANGALA TALUK, DISTRICT MANDYA.—Thirty-one silver coins belonging to the East India Company were acquired as treasure trove

11. SILVER COINS, KANASAMUDRA, DISTRICT KOLAR.— Fifty two silver coins acquired as treasure trove belong to the East India Company.

WEST BENGAL

12. IMAGE OF VISHNU, P. S. DHANIAKHALI, DISTRICT HOOGHLY.— A black stone image of Vishnu (pi. LVIII A) was acquired from the Dhaniakhali Police Station by the Calcutta Circle of the Survey. This well preserved four-armed image of Vishnu measures 73.5 X 32.2 X 10 cm.

13. STONE IDOLS, P.S. ENGLISHBAZAR, DISTRICT MALDA.— Eleven stone images of Vishnu (pi. LVIII B-C), Manasa, *navagraha* panel (pl. LIX), etc., datable from the ninth to the twelfth century AD were acquired by the Calcutta Circle of the Survey from the Englishbazar Police Station, Malda.

IV. OTHER IMPORTANT DISCOVERIES

ANDHRA PRADESH

1. SCULPTURES, DHOBI GHAT, HYDERABAD DISTRICT HYDERABAD— While digging the foundation for drainage pipe by the Municipal Corporation of Hyderabad two *Siva-lingas* with *yonipitha* (45x70x70 cm and 70x50x54x cm) carved on granite blocks were noticed by the Hyderabad Circle of the Survey. One of these datable to the late medieval period, contains two figures of standing devotees shown with folded hands.

2. SCULPTURE, SECUNDERABAD, DISTRICT HYDERABAD.— D.R. Gehlot assisted by B. Vidyadhara Rao and C. Ramadevi of Hyderabad Circle of the Survey during the course of inspection of the site discovered a Ganesa image in granite from a locality called Nandalanagar of Lalaguda, Secunderabad at a depth of 40 cm. This four-armed seated crowned deity (28 X 26.5 X 14 cm), carrying an axe, noose *(pasa),* broken tusk *(danta),* a bowl of sweet *(modaka)* and trunk turned right, is assignable to the late medieval period.

3. SCULPTURES AND CAVE, SECUNDERABAD, DISTRICT HYDERABAD.— A late medieval standing image of Hanumana (64x23x10-5 cm) of granite in *anjali mudra* was found in a miniature brick masonry shrine in front of a rock-cut cave, locally known as *Baba-Ka-Math* near Pahadi Hanuman temple, Addagutta, Lalagunda, Secunderabad. Inside the cave were noticed images of Nandi and Ganesa of medieval period by D.R. Gehlot, J. Varaprasada Rao and C. Rama Devi of Hyderabad Circle of the Survey.

4. TELUGU INSCRIPTION, GOLKONDA FORT, DISTRICT HYDERABAD.— The Hyderabad Circle of the Survey reported the discovery of a Telugu inscription in the characters of twelfth century AD in five lines on a boulder outcrop in Hanuman shrine near the Petla Burj of Golkonda fort.

5. MEGALITHS AND MEDIEVAL FORT, BIJGIR SHARIF, DISTRICT KAREEMNAGAR.— The Directorate of Archaeology and Museums, Government of Andhra Pradesh reported the discovery of a few megalithic burials in the outskirts of the village. Besides, medieval fort, built of lime and stone was also noticed on the hill-top.

6. TEMPLE, NITTUR, DISTRICT KAREEMNAGAR.— Remains of a temple belonging to Kakatiya period was noticed by the Directorate of Archaeology and Museums, Government of Andhra Pradesh.

7. MISCELLANEOUS FINDS, RAIKAL, DISTRICT KAREEMNAGAR.— The Directorate of Archaeology and Museums reported the discovery of an iron ore and slags for manufacturing iron implements, datable to medieval times.

8. LABEL INSCRIPTION, GUMMADIDURRU, DISTRICT KRISHNA.— The Hyderabad Circle of the Survey reported the discovery of a Brahmi inscription in two lines on a lime stone pillar datable to second-third century AD.

9. ROCK SHELTERS, JAGANNADHA GUTTA, DISTRICT KURNOOL.—During an inspection of the site by Hyderabad Circle of the Survey, a series of natural rock shelters were noticed, apart from the temples, stepped wells etc. discovered earlier.

10. JAINA TEMPLE, SANGAMPALLY, DISTRICT NELLORE.— A ruined Jaina temple (twelfth-thirteenth century AD) was noticed by the Directorate of Archaeology and Museums, Government of Andhra Pradesh.

11. ROCK-CUT TEMPLE, SIDDULAYAKONDA, DISTRICT NELLORE.— A Jaina rock-cut temple (twelfth century AD) situated 3 km west of Podalakur was found by the Directorate of Archaeology and Museums, Government of Andhra Pradesh.

12. EARLY-HISTORIC HABITATION, VEDAPALEM, DISTRICT NELLORE.—The Directorate of Archaeology and Museums, Government of Andhra Pradesh, reported the discovery of early historic habitation yielding red, black-and-red and black-polished wares.

13. MEGALITHS, KOTHAKALLURU, DISTRICT PRAKASAM.— The Directorate of Archaeology and Museums, Government of Andhra Pradesh reported the discovery of a few megalithic burials in the nearby village.

14. STONE TOOLS, RAMATIRTHAN, DISTRICT PRAKASAM.— A few middle palaeolithic stone tools and megaliths, were noticed 5 km away from the village, by the Directorate of Archaeology and Museums, Government of Andhra Pradesh.

15. MEGALITHS AND ANCIENT TEMPLES, SIDDHANA KONDURU, DISTRICT PRAKASAM.— Two ancient temples over the hill top and a few megaliths were noticed at the foot of the hillock by the Directorate of Archaeology and Museums, Government of Andhra Pradesh.

16. INSCRIPTIONS, PAVURALLAKONDA, DISTRICT VISHAKHAPATNAM.—The Directorate of Archaeology and Museums, Government of Andhra Pradesh noticed seventeen new inscriptions found at Pavurallakonda near Bhimili while remaining inscriptions belong to the tenth-fourteenth century AD.

17. TEMPLES, MUDDURTHI, DISTRICT VISHAKHAPATNAM.— The Directorate of Archaeology and Museums, Government of Andhra Pradesh discovered two temples at Panchadharla. The temple of Sri Sangamesvara belongs to twelfth century AD and the temple of Dharmalingesvarasvamy built during the time of Chalukyas of Yelamenchi (thirteenth century AD).

18. COPPER-PLATE INSCRIPTION, ANNARAM, DISTRICT WARANGAL.—The Directorate of Archaeology and Museums, Government of Andhra Pradesh reported the discovery of copper-plate inscription of thirteenth century AD.

19. SCULPTURES, WARANGAL FORT, DISTRICT WARANGAL.— The Hyderabad Circle of the Survey reported the discovery of some architectural members, sculpture of Ganesa, a *trisula,* head of Siva and *kapala,* all made of stone, found during the debris clearance around the partly exposed mound known as Deepagadda.

20. SCULPTURES, PEDDAVEGI, DISTRICT WEST GODAVARI.— Six loose stone sculptures consisting of seated Ganesa, Nandi, standing Brahma, Bhairava, Siva-Parvati and one unidentified broken figure of seventh-eighth century AD were noticed by R. V. Siva Sarma of Hyderabad Circle of the Survey.

21. TELUGU INSCRIPTION, PEDDAVEGI, DISTRICT WEST GODAVARI.— The Hyderabad Circle of the Survey noticed a Telugu inscription in the characters of eighth-ninth century in ten lines on a stone slab from the mound.

BIHAR

22. MICROLITHS, DISTRICT EAST SINGHBHUM.— The Geological Survey of India reported the discovery of some crude microliths from top of the gravel mounds at Tangarhol (22° 25' 30"; 86°41' 40") and Sirbai (22° 20'; 86° 39' 15") in the District.

GUJARAT

23. HARAPPAN SITE, KANKOT, DISTRICT RAJKOT.— The Department of Archaeology, Government of Gujarat, reported the discovery of a Harappan village Kankot in Vankaner taluk. The pottery from the mound (165 X 160 m) suggests a late Harappan settlement, but the height indicates possibilities of an earlier horizon.

HIMACHAL PRADESH

24. KUSHANA POTTERY, NIRMAND, DISTRICT KULLU.— The students of Archaeology group of the Punjab University led by D.K. Handa, discovered Kushana pottery from Nirmand.

25. KUSHANA PTTTERY, DUTTA NAGAR, DISTRICT SHIMLA.—The students of Archaeology group of the Punjab University, Chandigarh led by D.K. Handa, discovered Kushana pottery from Dutta nagar.

26. ANCIENT MOUNDS, DISTRICT SIRMUR.— The Department of Language and Culture, Himachal Pradesh, reported the discovery of ancient temple remains, structures, sculptures, architectural fragments, pottery, baked-bricks, etc., ranging in date from Sunga-Kushana to the medieval period from Sirmaurital, Amboya, Byas in Paonta town and Puruwala Ambiwala, Sadar and Mirpur in tehsil Nahan.

27. TEMPLE, MANGARH, DISTRICT SIRMAUR.—The Department of Language and Culture, Himachal Pradesh noticed a Siva temple at village Mangarh in tehsil Pachhad. The temple enshrines a *Siva-Linga* and belongs to the late Gupta period. The *mandapa* of the temple shows straight walls having no side projection *(rathika)*. It comprises three *sakhas* (jambs), four lintels on top, carved richly with figures and floral ornamentation. Images on the innermost jamb at the base represent two river goddesses Ganga and Yamuna.

KARNATAKA

28. ANCIENT MOUND, ANUVANAHALLI, DISTRICT CHIKMAGALUR.— N.S. Rangaraju of the Post graduate Department of Ancient History and Archaeology, University of Mysore, reported the discovery of antiquities belonging to Neolithic, megalithic, early historic Satavahana and Vijayanagara period, besides, coins of Tippu and Mysore Wodeyar at Anuvanahalli, a small village near Shivani, Tharikeri taluk.

29. LABEL INSCRIPTION, SANNATHI, DISTRICT GULBARGA.— During the inspection of the site, one label inscription in Brahmi characters of second century AD engraved on a fragmentary memorial stone depicting seated male figure, inside the premises of Chandralamba temple was discovered by D.R. Gehlot, assisted by J.Vara Prasada Rao of Hyderabad Circle of the Survey.

KERALA

30. MESOLITHIC SITE, NIRMALAGIRI, DISTRICT KANNUR.— During Archaeological field study in Kuthuparamba of Kannur District in north Kerala, several mesolithic implements were discovered from Nirmalagiri by P. Rajendran of the Department of History, Kerala University. The evidences obtained from Nirmalagiri is the first of its kind which include various types of scrapers, blades, borers, burins, lunates, points, flake and blade cores. The artifacts are found on high lateritic surface, and the region is littered with a lot of debitages and worked nodules along with the raw materials.

Quartz was the raw material used by the mesolithic man at Nirmalagiri as in other prehistoric sites in Kerala, and it was obtained as river-worn pebbles from the bed of Peruvampipuzha which flows 1 -5 km away from the site.

The implements are made on flakes, blades and nodules detached from the quartz pebbles and they have similarity with the mesolithic finds reported from various sites in Waynad, Malappuram, Palghat, Kollam and Thiruvananthapuram Districts. At Tenmal rock-shelter habitation site the mesolithic culture was dated by carbon 14 to 5210 ± 110 BP and more or less a similar date may be assigned to the mesolithic finds from Nirmalagiri in Kuthuparamba. Kuthuparamba being a riverine region with thick vegetation the mesolithic people might have exploited the rich faunal and floral stock then existed in the region along with the aquatic animals obtained from the river.

31. MEGALITHIC URN BURIAL, KARIMPALUR, DISTRICT KOLLAM.— P. Rajendran of the Deartment of History, Kerala University, during the course of exploration noticed a megalithic site at Karimpalur in Piravanthur. The evidences which were found during digging of a well include a large jar, two vases and an iron axe. Except the iron axe other evidences were found inside a large pottery which was found at a depth of 3 m. The stratigraphy of the excavated section clearly indicate that the jar was placed in a vertical pit dug through the primary laterite. The jar was closed from above with a prepared rock slab and the iron axe was placed over the rock slab.

MADHYA PRADESH

32. STONE AGE TOOLS, SUKHI SIWANIA, DISTRICT BHOPAL.— Narayan Vyas of Bhopal Circle of the Survey collected Early Stone Age tools from the agricultural field near the village.

33. NEOLITHIC CELT, GUJJARA, DISTRICT DATIA.— D. Dayalan of Bhopal Circle of the Survey collected a Neolithic tool from the village.

34. PARAMARA SCULPTURES, KUNJARA AND RAMPUR, DISTRICT DHAR.—Manuel Joseph of Bhopal Circle of the Survey noticed the Paramara sculptures representing Lakshmi-Narayana, Ganesa, *Tirthankara,* etc., from the village.

35. RUINED TEMPLES, MANDU, DISTRICT DHAR.— A.K. Soni of Bhopal Circle of the Survey noticed a ruined temple, dedicated to Siva near Mandu, which belonged to fourteenth-fifteenth century AD.

36. RUINED PARAMARA TEMPLE, WASVI, DISTRICT DHAR.—Narayan Vyas of the Bhopal Circle of the Survey noticed a ruined Paramara temple on the bank of the Koram river near the village.

37. STONE AGE TOOLS, WASVI, DISTRICT DHAR.—Narayan Vyas of the Bhopal Circle of the Survey collected early stone age and Mesolithic tools in the vicinity of the village.

38. CHALCOLITHIC ROCK PAINTING, MANCHI, DISTRICT RAISEN.—Narayan Vyas of the Bhopal Circle of the Survey noticed few painted rock shelters near the village, depicting animal figures which can be dated to the Chalcolithic period.

39. RAILING PIECES, STUPA 2, SANCHI, DISTRICT RAISEN.— The Bhopal Circle of the Survey reported the discovery of a few railing pieces decorated with lotus and animal figures near Stupa 2.

40. VOTIVE INSCRIPTIONS, SANCHI, DISTRICT RAISEN.— R.C. Agrawal of the Bhopal Circle of the Survey during the course of conservation work noticed eight votive inscriptions at Stupa 2.

41. VOTIVE INSCRIPTIONS, SATDHARA, DISTRICT RAISEN.— R.C. Agrawal of the Bhopal Circle of the Survey, in the course of debris clearance at Satdhara, reported the discovery of four votive inscriptions found engraved on different parts of the stupa railings.

42. PARAMARA SCULPTURES, UJJAIN, DISTRICT UJJAIN.—Narayan Vyas of the Bhopal Circle of the Survey noticed Paramara sculptures in Singhuri area. Of these a life size image of *Mahisasuramardini* is unique.

43. PARAMARA SCULPTURES, VIDISHA, DISTRICT VIDISHA.—During the course of conservation work a number of sculptures were found at Bijamandal by the Bhopal Circle of the Survey. These represent Chamunda, Siva, Vishnu, Ganesa, Parvati, Lakshmi and *pancha-mukha Siva-linga,* etc. The *Siva-linga* bears on inscription with a date VS 1276.

44. STONE AGE TOOLS, MOYDA, DISTRICT WEST-NIMAR.—Narayan Vyas of the Bhopal Circle of the Survey collected late stone age and mesolithic tools in the vicinity of the village.

MAHARASHTRA

45 BUDDHIST CAVES, JAKHINWADI, DISTRICT SATARA.—P.N. Kamble assisted by C.K. Bagul, G.L. Gaikwad and T. A. Quraishi of the Aurangabad Circle of the Survey noticed a group of twelve Buddhist caves near Jakhinwadi. These caves located on the spur of Agashiva mountain overlooking the Koyana river, are connected with a motorable road from Karad to Dhebewadi.

MANIPUR

46. EARLY HISTORICAL POTTERY, MAYANG IMPHAL, DISTRICT BISHNUPUR.— S.B. Singh and S.R. Singh of the Department of Archaeology, Manipur collected sherds of red and buff wares and two bronze vessels, besides locating an ancient capital site of the Khuman principality of Manipur at Mayang, on the left banks of the river Imphal.

47. STONE INSCRIPTION, NAMBOL, DISTRICT BISHNUPUR.— A stone inscription in archaic Meitei script assignable to eighteenth century was discovered by the Department of Archaeology, Government of Manipur.

RAJASTHAN

48. COPPER TOOLS, NAMANA, DISTRICT BUNDI.—Om Prakash Sharma of Bundi during the course of exploration discovered three copper tools, *viz.,* two sharp-edged axe (4.8" X 3.7" and 2.9" X 4" and scraper 18.5" X 7") possibly, belonging to the pre-Harappan period.

TAMIL NADU

49. INSCRIPTIONS, DINDIGUL, DISTRICT ANNA.—An inscription belonging to eleventh century AD was discovered in Samudrapatti, Natham taluk, by C. Santhalingam of the Department of Archaeology, Government of Tamil Nadu. He also reported the discovery of three inscriptions belonging of the reign of Rajendra Chola on a natural rock at Natham.

50. MEGALITHIC SITE, KADAMPUR, DISTRICT CHIDAMBARANAR.—An urn-burial site was located at Kadampur, Kovilpatti taluk by D. Gopalan of the Department of Archaeology, Government of Tamil Nadu. Besides, sherds of black-and-red ware were also collected from the site.

51. TEMPLE, KADAMPUR, DISTRICT CHILDAMBARANAR.—A Siva temple of thirteenth-fourteenth century AD was discovered in Kadampur, Kovilpath taluk by D. Gopalan of the Department of Archaeology, Government of Tamil Nadu. Inscriptions of Veera Pandya and Kulassakara Pandya of thirteenth century AD refer to this village as *"Asi nattuk Kadambil"* and the Lord as *"Perungkaruneeswaram Udaiyar"*.

52. COINS, KANCHIPURAM, DISTRICT CHENGAI M.G.R.—R. Muthu, of the Department of Archaeology, Government of Tamil Nadu reported the discovery of gold coins of Krishna Deva Raya of Vijayanagara dynasty at Kanchipuram.

Two coins issued by Travancore kings were also discovered at Madurai by C. Santhalingam of the same Department. Also recovered by him is a coin of Vanadhirayar at Silaiman which bears the figure of Garuda in one side and on the other there is inscription "Samarakolakalan".

53. CAIRN CIRCLES, DISTRICT COIMBATORE.—S. Selvaraj of the Department of Archaeology, Government of Tamil Nadu reported the discovery of cairn circles in Seerappalayam and Pattanparai and cist burials in Kallimedu and southern bank of Appachikkoundonpathy river all in Coimbatore taluk.

54. MEGALITHS, KONGANPALAYAM, DISTRICT DHARMAPURI.— A twenty-four legged sarcophagus discovered by S. Selvaraj and T. Subramanian of the Department of Archaeology, Government of Tamil Nadu discovered a twenty-four legged sarcophagus (1.25 X 0.55 m) alongwith a five legged jar, sherds of red ware, a sword and an axe from a place called Konganpalayam in Krishnagiri taluk.

A menhir (height 3.25 m) was also noticed at Kottur near Thirumalavadi in Palghat taluk and another menhir (height 5 feet) at Bellaripalli near Veppanappalli in Krishnagiri taluk of the same district. Besides, they also located a number of megalithic sites in Krishnagiri taluk namely Chinnakkothur, Purachandur, Beemardapalli, Kothakrishnapuram, Devarkundani, Nedunchalai and Chennachandiran.

55. SCULPTURE, KUMMALAPURAM, DISTRICT DHARMAPURI.— An image of Vinayaka (1 m height) belonging to Chola period was noticed by S. Selvaraj and T. Subramaniam of the Department of Archaeology, Government of Tamil Nadu, in a Siva temple at Kummalapuram, Hazur taluk.

56. PALAEOLITHIC TOOLS, VARATTANAPALLI, DISTRICT DHARMAPURI.— S. Selvaraj and T. Subramaniam of the Department of Archaeology, Tamil Nadu noticed palaeolithic tools in Varattanapalli, Krishnagiri taluk.

57. INSCRIPTIONS, AAVIYUR, DISTRICT KAMARAJAR.—Two later Pandya inscriptions of thirteenth century AD were found engraved in a Siva temple at Aaviyur in Aruppukkottai taluk by C. Santhalingam of the Department of Archaeology, Government of Tamil Nadu. These inscriptions record the gift made by the natives of Aaviyur for the above mentioned temple administration and also the taxes levied for the same purpose.

A Vattallettu inscription of (ninth-tenth century AD) was also noticed in Tirumeninattaswamy temple of Tiruchchuzhial, Aruppukkottai taluk.

58. URN-BURIAL, VATHIRAYIRUPPU, DISTRICT KAMARAJAR.—Urn-burial site with sherds of black-and-red ware and iron implements was located by C. Santhalingam of the Department of Archaeology, Government of Tamil Nadu at a place near Vathirayiruppu in Srivilliputhur taluk.

59. TUNNEL AND CANNON, MADRAS, DISTRICT MADRAS.— A tunnel with masonry wall was discovered by the Madras Circle of the Survey to the north of St. George Gate of Fort St. George during earthwork operation. The tunnel was found to run over a hundred metres towards north-east along the moat wall. A flight of steps leads into it near the gateway and there are several circular vents, provided through the masonry wall of the tunnel and that of moat. An iron cannon bearing the royal insignia of Queen Victoria was discovered over the north-eastern inner bastion of the fort.

60. NEOLITHIC TOOLS, CHOLAMALAI, DISTRICT MADURAI.— V. Vedachalam and C. Santhalingam of the Department of Archaeology, Government of Tamil Nadu, noticed neolithic celts at Cholamalai in Uthamapalayam taluk.

61. INSCRIPTIONS, DISTRICT MADURAI.— C. Santhalingam of the Department of Archaeology, Government of Tamil Nadu noticed two inscriptions. The first one belongs to the Nayaka period found in a small temple near a village called Venkatathirikott in Nilakottai taluk and the other belonging to Vanadhirayar period, mentions the gift to Alager temple in Madurai taluk.

62. CAIRN-CIRCLES, MALAYAKOUNDANPATTY, DISTRICT MADURAI.— C. Santhalingam of the Department of Archaeology, Government of Tamil Nadu located cairn circles in Malayakoundanpatty in Palani taluk.

63. URN-BURIAL SITE, KARAIKUDI, DISTRICT PASUMPON MUTHU RAMALINGAR.— C. Santhalingam of the Department of Archaeology, Government of Tamil Nadu discovered an urn-burial site along with black-and-red ware sherds and iron implements at Karaikudi in Karaikudi taluk. The findings were noticed on the riverbed of Thennaru.

64. INSCRIPTIONS AND SCULPTURES, THODAIYUR, DISTRICT PUDUKKOTTAI.— Two inscriptions in Tamil and Grantha characters were discovered *in situ* on the north-eastern corner of the *prakara* of Siva temple during conservation work undertaken by the Madras Circle of the Survey. One of these, issued during the fifth regnal year of Vikrama Chola corresponding to AD 1123, records a donation of land. Sculpture depicting Chola features notably of Vishnu, Bhikshatana Siva and Brahma made on white gneiss were discovered below the *maha-mandapa* during its conservation work.

65. SCULPTURES, TIRUVASALPURAM, DISTRICT PUDUKKOTTAI.— Bronze idols of Nataraja, Sivakami and Sundaramoorthy belonging to thirteenth-fourteenth century AD was located in a Siva temple in

Tiruvasalpuram, Tirumayan taluk by P. Gaudamaputhiran, of the Department of Archaeology, Government of Tamil Nadu.

66. SCULPTURES, NAGAPATTINAM, DISTRICT QAID E-MILLET.—Bronze idols of Nataraja, Vinayaka and godesses (eleventh-twelfth century AD) were noticed by P. Gaudamaputhiran of the Department of Archaeology, Government of Tamil Nadu.

Besides, a bronze idol of Nataraja of Chola period was also noticed in Manakkadu, Vedaranyam taluk.

67. TEMPLES, THALIR MARUNGUR, DISTRICT RAMNAD.— Two temples with inscriptions of the later Pandya temples were noticed in a place called Thalir Marungur in Tiruvadanai taluk, by C. Santhalingam of the Department of Archaeology, Government of Tamil Nadu. He also reported the discovery of two inscriptions of tenth century AD at Neeravi and Neeravi Karisalkulam in Kamuthi taluk.

68. THRONE PLATFORM, RAJAGIRI FORT, GINGEE, DISTRICT SOUTH ARCOT.— A platform with the ornate mouldings of *upana, maha-padma tripatta-kumuda, kantha* and *kapota* was exposed by the Madras Circle of the Survey after clearing the debris accumulated in front of the palace structure exposed in 1975. All round the platform, lime concrete flooring was noticed. The platform, located at a lower level than the structure, could be approached through two flight of steps located at the centre and at the extreme corner of the structure. The top of the platform is paved with a single granite slab of imported variety. A cylindrical backrest of stone was found on top of it. From the location, ornamentation and other factors, this platform might have been used to accomodate the throne of the king while giving audience to visitors.

69. COPPER COINS, BHOODALUR, DISTRICT THANJAVAR.—Fifty-four copper coins issued by Travancore king Vesrakeralan (fourteenth century AD) were recovered by P. Gaudamaputhiran of the Department of Archaeology, Government of Tamil Nadu from Bhoodalur, Orathur taluk. Of these, some coins bear the legend *'Verakoralan* in Nagari script while others contain the inscription *'Kandarangusa'.*

70. URN-BURIAL SITE, KSSZHAMBUR, DISTRICT TIRUNELVELI KATTABOMMAN.— An urn-burial site was located by D. Gopalan of the Department of Archaeology, Government of Tamil Nadu at Ksszhambur in Ambasamudram taluk.

UTTAR PRADESH

71. ROCK-SHELTER AND MEDIEVAL TEMPLES, DISTRICT ALMORA. — Hem Raj of Regional Archaeological Unit, Almora, Government of Uttar Pradesh, explored a painted rock-shelter and cup-marks in a thick forest near Doona-Pani (near Kasar Devi temple) about 12 km away from Almora town. The paintings in ochre and white colours are executed on the surface of ceiling of the shelter, mainly depicting row of human and animals figures, trees and wavy lines. A cluster of thirty-five cup-marks was observed on a foot-path leading to the shelter. There are a number of unpainted rock-shelters in the vicinity of the painted-rock-shelter.

Suresh Kumar Dubey of Regional Archaeological Unit,, Almora discovered a medieval temple at village Majhaun near Maurnaula on Almora-Devidhura motor road. Stone sculptures of Mahishasuramardini, Uma-Mahesha, Seshasayi-Vishnu, Ganesa *and yaksha* were collected (medieval

period) from a modern temple at Dasaun village on the left bank of river Suyal.

Remains of an early medieval temple known as *Siva-mandir* was brought to light near the village Chitai. Stone images of Ganga and Surya alongwith a *chaitya*-window carved with Vinadhara-Siva in the centre, door-jamb, lintel and lower part of a pillar belonging to *circa* eight-ninth century AD were noticed. Besides, ruins of small water-tank situated nearby also belong to the same period.

A stone sculpture of Seshasayi Vishnu of medieval period was also noticed in a modern temple of Banadi-Devi near Paudhar on Almora-Devidhura motor road.

A medieval temple was also noticed at village Dhaura on Almora-Devidhura motor-road alongwith a number of stone sculptures of Uma-mahesa, Lakshmi-Narayana and Siva were found in the sanctum of the temple. An inscription in Devanagari script dated Saka 1319 (AD 1397) is found engraved on the image of Lakshmi-Narayana.

Suresh Kumar Dubey of the Unit, discovered stone sculptures of Lakshmi-Narayana, Sapta matrika panel, Ganesa etc., of medieval period in a modern temple at village Bhujan in Ranikhet.

72. SCULPTURE, MOU, DISTRICT BANDA.— Rama Shankar of the Directorate of Archaeology and Museums, Lucknow reported the discovery of a Lakulisa image (117x76 cm) datable to ninth century from a village called Lauri-Lukhari.

73. MISCELLANEOUS OBJECTS, BANASUR-KA-KILA, SONKPUR, DISTRICT HARDOI.— Rakesh Kumar Srivastava and Ram Gopal Mishra of the State Archaeological Organisation, Government of Uttar Pradesh during the course of exploration collected sherds of black-slipped, NBP, grey and red wares. The occurrence of a few fragmentary stone sculptures, Siva-*linga* of buff sand stone and carved bricks-bearing scroll and lotus-leaf designs indicate the presence of early medieval brick temples at this site.

74. SIVA TEMPLE, DISTRICT JALAUN.—Ambika Prasad Singh of State Archaeological Organization, Government of Uttar Pradesh, noticed a Siva-temple at Kalapi on the right bank of river Yamuna. This rectangular temple with two *Siva-lingas* in the sanctum is datable to eighteenth century AD. The *vitana* (ceiling) of the cella is plain. Images of Ganesa, Lakshmi, Siva, Durga etc., are carved in the niches of the cella.

75. TEMPLE AND CHHATRIS, DISTRICT JHANSI.— Ambika Prasad Singh of the Sate Archaeological Organization, Government of Uttar Pradesh, noticed some *Samadhi-temples* and *chhatris,* etc., in Jhansi city. Among these, a *samadhi-temple,* datable to eighteenth century AD is having a *Siva-linga* and Nandi installed in the sanctum and porch of the temple. A few paintings are also found on the exterior wall of the temple.

The *chhatri* known as *'Sone-Rao-Ki-Bagia'* datable to eighteenth century AD is noteworthy for its wall-paintings. The exterior and interior walls and ceilings are full of murals, depicting Rama-*lila,* Krishna-*lila* and mythological scenes. Besides, Murli Manohar temple, datable to eighteenth century AD with sanctum, *mandapa* and porch is also notable. The images of Radha-Krishna and Rukmini are installed in its sanctum.

76. POTTERY AND FRAGMENTARY SCULPTURES , PAL BARKHAR AND MAKSUDPUR, DISTRICT LAKHIMPUR.— Krishna Kumar Singh of the State Archaeological Organization, Government of Uttar Pradesh

discovered wall-paintings in a Siva temple (fifteenth century AD) in village Barkhar during the course of exploration of villages in Lakhimpur. A few fragmentary sculptures of the medieval period were also found in the sanctum of the temple.

A number of Kushana bricks (35x20x60 cm) alongwith red ware of the same period were also noticed at Balmia Barkhar.

77. TEMPLE REMAINS, LAXMIPUR, DISTRICT MAHARAJGANJ.— Remains of a brick temple was noticed at Kanahiya-baba-ka-mandir by Raj Kumar of the State Archaeological Organization, Government of Uttar Pradesh. The square *garbha-griha* of the temple measures 1 -50 m. It consists of a *Siva-linga,* besides, pieces of architectural members, fragmentary images of Vishnu and other deities which could be assignable to the twelfth century AD. The plan of other temples would indicate the presence of four subsidiary brick temples on its four corners.

78. MISCELLANEOUS OBJECTS, DISTRICT PITHORAGARH.—The Regional Archaeological unit, Almora, reported the discovery of more than half a dozen copper anthropomorphic figures unearthed by local villagers at village Bankot near Sheraghat on Almora-Berinag motor road.

Suresh Kumar Dubey of Regional Archaeological Unit, Almora, discovered remains of an early medieval temple in village Shera, situated on the left bank of Sarayu near Ghat on the way to Pithoragarh. A big *chaitya-* window with Lakulisa was noticed. Another *chaitya* window is carved with the combat of lion with a boar.

WEST BENGAL

79. TEMPLE OF SIVA, KHUDKA, DISTRICT BARDHAMAN.— During the course of exploration in Asansol sub-division of Bardhaman, Santanu Maiti of Calcutta Circle of the Survey noticed a stone temple of Siva, datable to eleventh-twelfth century AD, besides, a mound at Nuni village yielding sandstone sculptures of Parsvanatha, Devi, a *hew/sati-* stone and sherds of red ware, datable to seventh-eighth century AD.

80. TEMPLE OF LAXMI JANARDANA, SUNDARUSH, DISTRICT HOOGHLY. — A beautiful specimen of *pancharatha* brick built temple of Laxmi- Janardana was noticed by T. J. Chakraborty of Calcutta Circle of the Survey, at village Sundarush, Pursurah Police Station.

V. RADIOCARBON DATES [1]

Radiocarbon dates presented in the following pages were determined at the Physical Research Laboratory, Ahmedabad. The sites[2] are arranged alphabetically and statewise. The dates are based on half life value of 5730 ± 40 years; and for conversion into BC/AD scale, the year 1950 is to be taken as the base. The dates are not corrected for any $^{14}C/^{12}C$ variations.

ARABIAN SEA

1. OFF MANGALORE COAST

i. PRL - 1569. Quaternary	> 35,000
Carbonate portion of sediment core. Depth 24-27 cm. Core No. 2413	
ii. PRL - 1570. Quaternary	11,440 ± 280
Carbonate portion of sediment Core. Depth 39-^2 cm. Core No. 2413.	

2. OFF EASTERN ARBIAN SEA

i. PRL - 1546.Quaternary	3090 ± 230
Carbonate from ocean sediment core. Depth 0-2 cm. Core No. SM-3283	

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[1]Contributed by Sheela Kusumgar and MG Yadava of the Physical Research Laboratory, Navrangpura, Ahmedabad 380 009. Further details can be obtained from excavators. For calibration procedures, see *Radiocarbon,* Vol. 28, No. 2B, 1986 and Vol. 35, No. 1,1993. A set of available calibrated archaeological dates has been supplied to the Libraries of the Archaeological Survey of India, New Delhi; Indian Council of Historical Research, New Delhi and Deccan College, Postgraduate and Research Institute, Pune.

[2]Samples submitted by : 1-2, 6-7 and 14, Physical Research Laboratory, Ahmedabad; 3, Excavation Branch V of the Survey, Vadodara; 4, University Museum, 33rd & Spruce Streets, Philadelphia, USA and Department of State Archaeology, Gujarat; 5 and 8, Deccan College, Postgraduate and Research Institute, Pune; 10, Prehistory Branch of the Survey, Nagpur; 12, Hindustan Copper Ltd. KhetriCopperComplex,Khetrinagar-333 503; 13, Geological Survey of India, Lucknow.

ii.	PRL - 1547. Quaternary Carbonate from sediment core. Depth 6-11 cm. Core No. SM-3283.	3790 ± 160
iii.	PRL - 1548. Quaternary Carbonate from ocean sediment core. Depth 17-20 cm. Core No. SM-3283.	6970 ± 190
iv.	PRL - 1549. Quaternary Carbonate from ocean sediment core. Depth 26-29 cm. Core No. SM. 3283	11280 + 435 -410
v.	PRL - 1550. Quaternary Carbonate from ocean sediment core. Depth 40—45 cm. Core No. SM. 3283.	17535 + 525 -495

GUJARAT

3. DHOLAVIRA, DISTRICT KUTCH

i.	PRL - 1502 Harappa Culture Charcoal from Trench 48 X 92 X 4, Layer 6, depth 4.00 to 4.20 cm. Sender's Sample No. C 4.	3220 ± 120
ii.	PRL - 1505 Harappa Culture Charcoal from Trench 48 x 92 X 3+4. Layer 29, depth 4-65 m. Sender's Sample No. C7.	4400 ± 90

4. BABARKOT, DISTRICT BHAVANAGAR

i.	PRL - 1488. Sorath Harappan Charcoal from Trench 26L, Locus NWQUAD, Layer 5. Sender's Sample No. 190.	2700 ± 140

ii. PRL - 1490. Sorath Harappan 3330 ± 170

Charcoal from Trench 26M, Locus SE + SWQUAD, Layer 5. Sender's Sample No. 520

iii. PRL - 1487. Sorath Harappan 3930 ± 90

Charcoal from Trench Locus NW, Layer 6. Sender's Sample No. 196.

iv. PRL - 1492. Sorath Harappan 4130 ± 90

Charcoal from Trench 26M, Locus SW + SEQUAD, Layer 4. Sender's Sample No. 511.

v. PRL - 1493. Sorath Harappan 3700 ± 110

Charcoal from Trench 26 L, Layer 6. Sender's Sample No. 205.

5. PADRI, DISTRICT BHAVNAGAR

i. PRL - 1536. Harappan Culture 4130 ± 150

Charcoal from Trench J2, Layer 6, Locus 152. Depth 2-10 m. Sender's Sample No. Lot 152.

HIMACHAL PRADESH

6. REVALSAR, DISTRICT MANDI

i. PRL-1529, Quaternary Modern

Lacustrine sediment, Depth 0-80 to 0-90 m. Sender's Sample No. REV - 4/0-10

JAMMU AND KASHMIR

7. MANASBAL, DISTRICT SRINAGAR

i. PRL - 1521. Lake sediment 2330 ± 100

Organic portion of lacustrine sediment core. Depth 2-36 to 2.52 m. Sander's Sample No. 63-66 (6M1).

ii. PRL - 1522. Lake sediment 2620 ± 180

Organic portion of lacustrine
Sediment core. Depth 1.92
to 2.08 m.
Sender's Sample No. 74-77 (6M1)

iii. PRL - 1524. Lake sediment 2360 ± 110

Organic portion of lacustrine
sediment core. Depth 0-76
to 0.92 m.
Sender's Sample No. 103-106 (6M1).

iv. PRL - 1528. Lake sediment 1570 + 110

Organic portion of lacustrine
sediment core. Depth 004 to 006
m. Sender's Sample No. 4-6
(1M7)

v. PRL - 1552. Lake sediment 2120 ± 160

Organic portion of lacustrine
sediment core. Depth 4.94 to 5.10
m. Sender's Sample No. 1-4
(6M7).

KARNATAKA

8. BUDIHAL, DISTRICT GULBARGA

i. PRL - 1532. Neolithic 7950 ±210

Charcoal from Trench Tr-1,
Locus Ashmound - II, Layer 7,
Depth 2-80 m. Sender's Sample
No. 3

MADHYA PRADESH

9. CHAHIN NALA, DISTRICT EAST NIMAR

i. PRL-1541. Quaternary. Modern

Charcoal and tree barck from
Trench I, Locus 16, West of
datum, Depth 0-25 to 0-40 m.
Sender's Sample No. PI-22

ii. PRL - 1543. Quaternary — 840 ± 110

Charcoal + wood from Trench II, Locus 31, West of datum, Depth 0.50 m.
Sender's Sample No. PII-30

iii. PRL - 1544. Quaternary — Modern

Wood from Trench III,
Depth 1.54 m.
Sender's Sample No. PIII-4

iv PRL-1545. Quaternary — Modern

Wood from Trench III,
Depth 3.20 m.
Sender's Sample No. PIII-9.

10. SORAR, DISTRICT DURG

i. PRL - 1533. Proto-historical level — 670 ± 220

Charcoal from Trial trench,
Layer 10, Depth 2.45 m.

Sender's Sample No. SORAR/CH/91-3

MAHARASHTRA

11. ADAM, DISTRICT NAGPUR

i. PRL - 1450. Chalcolithic Culture — 2870 ± 90

Charcoal from Trench N7, Locus Quadrant 1, layer 5, Depth 1-9 m.
Sender's Sample No. ADM-CS-90-003

ii. PRL - 1458. Chalcolithic Culture — 2860 ± 120

Charcoal from Trench ZA5, Locus
Quadrant 4, Layer 17, Depth 5-29 m.
Sender's Sample No. ADM-CS-90-011

iii. PRL - 1452. Chalcolithic Culture — 3170 ± 120

Charcoal from Trench ZA5, Locus
Quadrant 4, Layer 12, Depth 3-93 m.
Sender's Sample No. ADM-CS-90-005

iv. PRL - 1456. Chalcolithic Culture — 2900 ± 100

Charcoal from Trench LB, Locus
Quadrant 3, Layer 15, Depth 4.95 m.
Sender's Sample No. ADM-CS-90-009

v. PRL -1361. Chalcolithic Culture — 3030 ±160

Charcoal from Trench S5, Locus Quadrant 2. Layer 11, Depth 7.25 m. Sender's Sample No. ADM-CS-003

RAJASTHAN

12. KHETRI COPPER MINE, DISTRICT JHUNJHUNU

i. PRL - 1525. Mining activity — 2501130

Wood from old working exposed through underground mine development.

UTTAR PRADESH

13. BHAGAUTA, DISTRICT BIJNORE

i. PRL - 1514. Quaternary — 150 ±120

Carbonate portion of kankar from seasonal Nala, Depth 2 m. Sender's Sample No. GK/QG/2/90

ii. PRL - 1515. Quaternary — 13120^{+870}_{-790}

Carbonate portion of kankar from seasonal Nala, Depth 4 m. Sender's Sample No. GK/QG/1/90.

14. Ghokakhal, District Nainital

PRL -1551. Quaternary. — 16300^{+740}_{-680}

Charcoal within soil layer, Depth 1.50 m.

VI. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS[1]

The present report incorporates the work done at Birbal Sahni Institute of Palaeobotany, Lucknow.

BIHAR

1. SENUWAR, DISTRICT ROHTAS.— In continuation of the investigation on the seed and fruit remains recovered from different horizons of Neolithic and chalcolithic Cultures at this site *(1990-91,* p. 103), detailed anatomical studies of wood charcoals were carried out. To reconstruct the model of the exploitation of woods by ancient settlers, for fuel and to meet out other requirements, one thousand seven hundred sixty five charcoal pieces from different layers of the cultural deposits were studied.

Period IA *(Neolithic; circa 2,200-1, 800 BC) :* Wood charcoals of *Capparis sepiaria (Heens), Madhuca indica (Mahua), Streblus asper (Dahia), Shorea robusta (Sal), Trewia phudiflora (Bhillaur), Acacia* sp. *(Khair* or *Babul)* and *Bambusa* sp. (Bamboo) are identified.

Period IB *(Neolithic-Chalcolithic; circa 1,800-1,200 BC):* Besides taxa from preceding phase, *Albizia* sp. *(Sims), Aegle marmelos (Bel), Lagerstroemia parviflora (Dhaura), Mesua ferrea* (Iron-wood/ *Nagkesar), Ziziphus* sp. (jujube), *Cassia fistula (amaltass)* and *Cannabis sativa (Bhang)* were also encountered. Amongst these, *Mesua ferrea* (Iron-wood) is one of the extremely heavy, hardest, heaviest and strongest timbers of India. The nearest source exploited by the settlers of Senuwar during this period, to obtain this quality timber, might be the evergreen forests of Bengal and Assam. All the same, occurrence of this wood signifies the knowledge of forest products of far-eastern region by ancient settlers in the Kaimur foot-hills of southern Bihar.

Period II *(Chalcolithic ; circa 1,200-600 BC)* : In addition to the use of timber plants in the preceding two periods, quality woods of *Dalbergia sissoo (Sheesham)* and *Cedrus deodara (Deodar)* are found in this phase. *Deodar* was indubitably exploited from the Himalayan forests. Equally important are the timber remains of *Artocarpus heterophyllus* (Jack-fruit tree or *Katahal)* and *Mangifera indica* (Mango), which indicate the cultivation of these trees for their fruits.

PUNJAB

2. MAHORANA (30° 28' N; 76° E), DISTRICT SANGRUR : Wood charcoal remains from pre-Harappan period *(circa* 2,300-2,100 BC) belong to *Prosopis spicigera (Shamil Jhandi)* and those from the transitional levels of pre-Harappan and Bara cultures *(circa* 2,100-1,900 BC) are identifiable to *Acacia* sp. *(Babul)* and *Shorea robusta (Sal).* Charcoal remains of *Capparis* sp. (either *Kareel - C. aphyalla* or *Heens* - C. *sepiaria)* are found from the cultural level of Period II *(circa* 800-400 BC). Further, from

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[1]Contributed by K.S. Saraswat and Chanchala Srivastava of the Birbal Sahni Institute of Palaeobotany, Lucknow-226007

the following period of Kushana culture (AD 100-200) the wood charcoal remains belong to *Anogeissus* sp. *(Dhau/Dhaukra), Cedrela toona (Toon), Propopis spicigera (Shamil Jhandi), Shores robusta (Sal)* and *Ziziphus* sp. (jujube).

VII. MUSEUMS

1. ARCHAEOLOGICAL MUSEUM, AIHOLE.— This museum laminated colour photographs of the selected Badami monuments of the Chalukyan period for display in the galleries. Iron rack was procured for fragmentary sculptures in the reserve collection. The galleries were painted and colour washed. Besides the models of stupas, index cards for the newly acquired antiquities were also prepared during the period under review.

2. GOVERNMENT MUSEUM, AJMER.— Besides attending to the repair works of five show cases in weapon's gallery, these were provided with varnish paint after cleaning. Arrangements were also made for better lighting facilities in the gallery. The exhibits in the museum were also classified and cleaned. Wooden pedestals in the Museum were repaired and treated with distemper colour wash. Further the museum also provided a map showing important Jaina sites in Rajasthan.

3. ALLAHABAD MUSEUM, ALLAHABAD.—The museum acquired hundred and fifty-seven antiquities and works of art through purchase during the period under review. These include seven stone sculptures, three gold, two silver, eighty potin, eleven copper and billon coins; thirty-three stamps and seals of terracotta; ten decorative art, armoury and eleven miscellaneous art objects.

Noteworthy among these are inscribed terracotta brick (35 X 25 X 11 cm) which refers to the name of king 'Adimitra' along with the regional name 'Dasharna' (first century BC); gold coin of king Kachagupta, bearing the legend *Kacha* on the obverse, the king is shown pouring incense on the altar and the goddess standing towards left on the reverse and legend is *sarvarajochchetta;* stone statue of a double-faced fragmentary dwarfish image *of yaksha* having one face on the front side and the other on the back. This standing image has both hands upraised as if carrying some weight, and wears a bicarnate turban over its head. Another fragmentary stone sculpture (77 X 47 cm) is of female goddess seated on a lotus along with a male figure reclining below (medieval). Also interesting is an inscribed clay seal (dia. 3 cm) depicting a dancing peacock (Gupta). Lastly a dagger with nicely decorated handle, made of ivory is also noteworthy. The main shaft of which has floral decoration and carved in the shape of an elephant, while the handle cover is shaped as a racing dear (length 34-5 cm).

During the period, the museum arranged a number of special exhibitions on paintings of Asit Kumar Haldar and K.N. Majumdar (October 1991), solo painting exhibition of the works of Smt. Rekha (November 1991), paintings and works of art of artists of U. P. (December 1991) and Buddhist *Than lea* (December 1991-January 1992). Illustrated lectures by eminent scholars like B.N. Mukherjee, Krishna Deva, D.P. Agarwal, K.K. Thapliyal, V.S. Pathak and Anand Krishna were organised under the Museum's educational programme besides a short-term summer course on *'Appreciation of Indian Art* (June 1991) and a clay-modelling workshop (November 1991) for students. An attractive introductory folder of the Museum and an illustrated catalogue of *'Thanka exhibition'* were also published. Ten objects from Museum's collection, selected for Indian Classical Art Exhibition in Germany were

handed over to the National Museum authorities. Museum's library acquired five hundred twenty-eight important books on various subjects relating to Art, Archaeology, History and Culture. The conservation and photographic facilities of the Museum were augmented by acquiring many sophisticated equipments.

4. GOVERNMENT MUSEUM, ALMORA.— During the period, fifty-five objects were acquired by the museum, including three textiles, five stone, thirty-seven iron, silver and copper and nine miscellaneous items. Notable among these are the images of two-armed Ganga(23 X 14 cm), four-armed Ganesa (37 X 24 cm; pl. LX A) and *eka-mukha Siva-linga* (45 X 13 cm). The image of Ganga is from Pithoragarh, datable to tenth-eleventh century AD. With her left arm placed on the thigh, she holds *amrita-ghata* in the right hand. Below, to her left is a seated attendant, while on her right, is seen an umbrella-bearer. Ganesa is seated with four-arms, holding respectively *modaka, parasu, akshamala, mulaka* or *danta* and decked with *yajnopavita. Eka-mukha-linga* has Siva's head, carved with third eye on fore-head, wears *karna-kundala* and *kanthahara.*

5. ARCHAEOLOGICAL MUSEUM, AMARAVATI.— The museum acquired one coin of lead belonging to the Satavahana period along with a stone sculpture of Kevala Narasimha. The damaged partition wall and the large niche displaying the Buddha image in the key gallery was replaced and painted in uniform colour.

6. ARCHAEOLOGICAL MUSEUM, BADAMI.— All the sculptures were re-arranged in the Gallery 4.

7. BIRLA MUSEUM, BHOPAL.— The museum published a catalogue of sculptures, coins etc., which were acquired between 1971 and 1989.

8. ARCHAEOLOGICAL MUSEUM, BIJAPUR.— During the period under review a cabinet showcase was restored with perspex sheet frame for displaying the coins of Adil Shahi rulers in Gallery 5 in the first floor. Four wall showcases with concealed lighting arrangement were prepared for displaying photographs of Adil Shahi rulers and miniature paintings of Bijapur school of medieval period in the same gallery. The museum also provided iron railing to the cannons and cannon balls displayed in the Gallery 4 in the first floor. The vacant niches in the first floor were concealed and the photographs of different monuments of Bijapur were displayed in the Gallery 4,5 and 6. The showcases of manuscripts and *sanads* were rearranged and kept separately one in each wing of Gallery 6. Two decorated jars displayed in the niches were provided with frames and glass in Gallery 6. An electric alarm was also fixed at the main door for a check on the visitors.

9. ARCHAEOLOGICAL MUSEUM, BODHGAYA.— Preparation of data-sheets of the museum objects and bilingual cultural boards were completed.

10. PRINCE OF WALES MUSEUM, BOMBAY.—The museum acquired twenty-nine antiquities during the period. These include elephant, terracotta (16 X 11.8 X 10.9 cm), from Ahichchhatra (late fifth century AD); round terracotta seals (2.6; 3.1; 2.1; 2.2 cm) from Uttar Pradesh, ranging in date between second and fifth century AD; round terracotta sealing (2-6 cm and 3.7 X 5.5 X 1 cm), with black slip (sixteenth century); terracotta concave seal (3.5 X 4.9 X 0.6 cm; 4.4 cm), Nalanda (eighth-ninth century AD); black clay seal (dia 4-4 cm), Indonesia (?) second-third century AD; terracotta round sealings (2.2 cm and dia 2.6 cm) with black slip, Uttar Pradesh, third century AD; woollen shawl with border 95 X 216 cm, loom-woven, Kashmir, nineteenth century AD; Dasavatara *ganjifa* (dia. 7 cm) set of one

hundred and eight in number at Chitrashala press; eight folds of a manuscript (32.3 X 12.2 cm) of *Yuddhajayotsava Charugrantha* of Gangaram, paper, western India, eighteenth century AD; two turbans, Shindeshahi cotton and *zari,* Gwalior (32 X 28 cm), Valamburi Ganesa (3.5 X 3.5 X 4.2 cm), brass, Maharashtra, nineteenth century AD and Silahara inscription (23 X42 X 157 cm), stone, Dombivali, Maharashtra, eleventh-fifteenth century AD. The museum library was also enriched by adding two hundred and one new books and hundred and thirteen periodicals.

An exhibition "Parasika" - The story of the Parsis, was organized in October 1991, in collaboration with K.R. Cama Research Institute. Besides, gallery talk and guided tours, the museum, also organized Art and Craft classes for the school children at children's creative centre, in November 1991 in the age group between 8 and 12 years. Apart from the dignitaries of various states, a four member delegation of the Ministry of Culture of the People's Republic of China, visited the Museum on 27 February 1992.

11. INDIAN MUSEUM, CALCUTTA.—During the year under report the Archaeological section of the Indian Museum acquired altogether twenty-eight antiquities through purchase. These include twenty seven terracotta objects, *viz.,* human figurines, busts, heads, moulds, animal figurines and a lamp, datable from the second century BC to eighth century AD. Only one stone sculpture of Surya belonging to the late medieval period was acquired.

The coin cabinet of the Museum was enriched by acquiring ninety-seven coins and medals (thirty-eight gold, twenty-three silver, five copper, one brass and thirty cupronickel and quarternary alloy) belonging to different periods of Indian history. Of these, mention may be made of one silver coin of Fath Shah of Bengal, one gold coin of Zaman Shah of Audadh, a set of fourteen rare gold, silver and copper coins of Kachhar and one special set of Jawahar Lai Nehru Commemorative coins issued from Bombay Mint. Coin gallery of the Indian Museum was renovated and reorganized by providing colourful sketches, drawings, photographs and labels for detailed information.

The Archaeological gallery displaying the sculptures of the medieval period from Uttar Pradesh, Madhya Pradesh, Bihar, West Bengal, Orissa and Tamil Nadu, etc., was renovated by providing false ceilings, cubicles and proper illumination. The photographs of temple architecture and excavated sites, charts, maps, etc., were also added to make the display more meaningful. The bronze gallery was also reorganized. A series of photographs indicating flora and fauna, places of worship, tattoo marks, etc., from Bharhut architectural remains were also installed.

12. ARCHAEOLOGICAL MUSEUM, MATTANCHERRY PALACE, COCHIN.—Besides general maintenance, the museum was reorganized during the period under review. The portraits of kings of Cochin were re arranged in chronological order. Some maps and charts were also added to the museum. The tri-lingual labels for the exhibits and the general board for the museum was done afresh and fixed. Photo documentation of the murals was completed along with the preparation of transparency for picture post cards. The acquisition of the list of documents, correspondence letters, *sanads,* land grant from the State Archives Department, Ernakulam and Trivandrum is in progress. Minor adjustments were made to shift two portraits to avoid congestion in the gallery. The wooden staircase leading to attic in Gallery 6 was provided with plywood covering and painted with matching colour. The museum was also visited by the dignatories from Portugal and France.

13. CHANDRADHARI MUSEUM, DARBHANGA.— During the period under review, the textile gallery was rearranged. The old lighting arrangement of the gallery was replaced with the new one, providing better lights to the gallery.

14. MAHARAJADHIRAJA LAKSHMISHWAR SINGH MUSEUM, DARBHANGA.— During the period under review, the *Rajasinghasana* gallery was reorganized. This unique *Rajasinghasana* has for its decoration gold, silver and precious stones. Other exhibits of the gallery comprise silver *palang, palki, nalki* and *tamdan.*

15. ARCHAEOLOGICAL MUSEUM, VELHA GOA, GOA.— Partition wall with plywood cover was provided to the Gallery 7. Besides fixing louvre type windows to the key gallery, the Gallery 2, 3, 4, 5 and Boat room were painted with matching colour. A wall showcase in the key gallery and another in Gallery 7 were provided with new plywood support and background cloth to give a new look. For visitors were provided moulded plastic chairs in the gallery. The museum was also visited by the Directors General of National Archives of Pakistan, Iran and Nepal.

16. STATE MUSEUM, GUWAHATI.— A number of objects ranging from old Assamese gold ornaments to the metallic utensils were collected by the museums during this period. Besides, an ethnographic gallery to exhibit the arts and artefacts of twelve different tribes, belonging to the hills and plains of Assam was also inaugurated. The exhibits include textiles, costumes, musical instruments, household utensils, hunting and agricultural implements, etc., displayed in showcases with the help of dioramas and models. These are supplemented by photographs, maps and charts in order to give maximum information to the viewers on the objects and their authors.

A workshop on ethnography *"Ethno - lab 92",* jointly organized by the National Museum, New Delhi and the Directorate of Museums, Assam is another major event. This was attended by scholars and musiologists of repute who delivered lectures on various subjects like technique and method of ethnographic field study, collection of objects, preservation, restoration, etc.

17. ARCHAEOLOGICAL MUSEUM, GWALIOR.— In addition to the installation of track light in the galleries of the museum coloured blow up locating different site museums in India was also prepared for display. Masonry pedestals were built in the courtyard in front of the hospital and the jail building for displaying the sculptures.

18. ARCHAEOLOGICAL MUSEUM, HALEBID.—Apart from providing a barricade to the iron pot, seven new masonry pedestals were made for display of sculptures in the open air. Besides, catalogue cards and data-sheets were also prepared.

19. ARCHAEOLOGICAL MUSEUM, HAMPI.— An image of Vishnu in stone placed on a masonry pedestal was shifted to the open air. Besides, showcases in Gallery 2 were painted and labels of the displayed objects in Gallery 3 prepared. The Hampi valley model was painted suitably including the railing. The aerial view of Hampi provided with sunmica was displayed. In addition four antiquities from this museum were selected for an exhibition "EXPO-92", Sivella in Spain. An exhibition of antiquities from recent excavations was also organized by the museum.

20. ARCHAEOLOGICAL MUSEUM, KHAJURAHO.— During the period, the museum retrieved twenty-six fragmentary architectural pieces and sculptures of Harihara, Uma-Mahesvara, dancing Ganesa,

Vishnu on garuda, Vamana, etc., from the local Police station, which were duly accessioned. For the purpose of security, lights were also provided in the open air Jardine Museum.

21. ARCHAEOLOGICAL MUSEUM, KONARAK.— The of ICOM delegates from different countries were visited the museum. Besides, the preparation of data-sheets of museum objects was also completed.

22. ARCHAEOLOGICAL MUSEUM, LOTHAL.— In all the galleries of the museum, honey-comb designed mesh were fixed to the windows.

23. STATE MUSEUM, LUCKNOW.— The museum acquired through purchase fifty-one objects which include coins, paintings, manuscripts, arms, ivory and metal images. Out of twelve coins purchased, one is square gold *mohar* of Shah Jahan(AH 1057) and eleven gold coins belonging to the Gupta period. These include one standard type coin of Samudra Gupta, one tiger slayer type and nine archer type coins of Chandra Gupta II. The museum also purchased three illustrated manuscripts. These are in Persian language; the first one belongs to eighteenth century. The second one deals with horses having fourteen illustrations and another gives the story of Bahrain chor containing five illustrations. One more manuscript (AD 1879) was obtained from Yogesh Deva of Khoria village in district Agra. In addition, the museum also purchased twenty-five paintings and nine illustrated folios of Shanama. The paintings belong to different schools, *viz.,* Mughal, Rajasthani, Nathadvara, etc. The other items purchased by the museum during the period consist of two inscribed swords (Raja Sarvjeet Singh, Taluqedar, Ramnagar, Delhi and Raja Sri Singh, Taluqedar, Ramnagar), dagger-shaped ivory paper weight; Jamawar Sherwani; one copper plate and an image of Devi in brass. Among the objects acquired as treasure trove four gold coins of Gupta period are noteworthy. These comprise standard type coin of Samudra Gupta, Karttikeya type of Kumara Gupta and two horserider type coins of Chandra Gupta.

24. GOVERNMENT MUSEUM, MADRAS.— The museum acquired following art objects through treasure trove from different places of Tamil Nadu. The notable ones from district Thanjavur include a crawling Krishna from Thiruvidaimaruthur; Ayyanar from Kulasekharanallur; Venugopala from Nannilam; crawling Krishna from Panchanadikulam, Vedaranyam; crawling Krishna basement of Dhupakkal and fragments of Thagattur Pethachikkadu from Vedaranyam; Siva, Nandi and *a pitha* from Tamaraipulam, Vedaranyam; Subrahmanya from Thanikkottam, Vedaranyam; brass vessel, lid, and vase from Ramanathapuram; Devi from Palakkodu; eleven miscellaneous objects from Kumbakonam; Vishnu and Devi images from Kudavasal and Devi from Mannargudi, one stone sculpture of Subrahmanya from Kudavasal and three round stone miscellaneous objects from Papanasam. The museum was further enriched by the acquistion of two icons each of Devi and Krishna from Tarangambadi; one Devi, one Venugopala from Kodukkai, Mailaduthurai in district Nagai Quaide Millet; an image of Devi and *pitham* from Rasipuram in district Salem.

Bilingual labels in the new extension gallery were renewed and labels for the Buddha gallery were being prepared. All the showcases in the Buddha gallery were repainted and varnished. The work of reorganization of bronze gallery is in progress. Besides, the museum also provided facilities for research to the scholars from India and abroad. The museum galleries were also visited by many distinguished guests, like U.S. Senator Larry Pressler and Sri Lankan Vice Admiral Clil Fernandez.

25. GOVERNMENT MUSEUM, MATHURA.— During the period under review eighty-one objects were accessioned which include twenty-one stone sculptures, fifteen terracottas, thirty-nine coins, three paintings, one inscribed stone, two manuscripts, one textile and two miscellaneous items. Of these two objects, *viz.,* a beautifully carved parasol *(chhatra)* in red sandstone (dia. 87.5 cm) from Sarai Azamabad, Mathura, of Kushana period (pl. LX B) and a stone slab carved with a Surya image (height 150 cm) of Gupta period from Mathura are noteworthy.

26. ARCHAEOLOGICAL MUSEUM, MURSHIDABAD.— The reorganized galleries of the museum was inaugurated by S. Nurul Hasan, the Governor of West Bengal, on August 11, 1991. A multi-coloured bilingual brochure was published and distributed to the distinguished visitors. On this occasion, aphoto exhibition was also organized by the museum.

27. ARCHAEOLOGICAL MUSEUM, NAGARJUNAKONDA.—The museum was visited by the Ambassador of Japan.

28. CENTRAL MUSEUM, NAGPUR.— The work of preparing a list of Geological objects is in progress. During the period under review stone sculptures, paintings, besides many archaeological objects were cleaned and preserved.

29. ARCHAEOLOGICAL MUSEUM, NALANDA.— The new gallery organized by the museum was thrown open to the public.

30. DISTRICT MUSEUM, NALGONDA.— During the period under review a new archaeological museum was thrown open to the public.

31. ARCHAEOLOGICAL MUSEUM, PURANA QILA, NEW DELHI.— Background cloth and front glass sheets were fixed in three wall showcases and the display of antiquities was done in two wall showcases of the museum.

32. GOVERNMENT MUSEUM, RAJAHMUNDRY.— A special archaeological exhibition was organized by the museum for two weeks. Another special exhibition of coins from the earliest times to the modern times including those of foreign rulers was also arranged by the museum during this period.

3 3. ARCHAEOLOGICAL MUSEUM, RATNAGIRI .—The building was taken over from the Bhubaneswar Circle for organizing the museum galleries.

34. TIPU SULTAN MUSEUM, SRIRANGAPATNA.— Besides providing a velvet cover to the furniture of Tipu Sultan, the model of Srirangapatna Fort and the two oil paintings were enclosed by railings. During the period under review, wornout rolling bamboo screens were replaced.

35. BHARAT KALA BHAVAN, ART AND ARCHAEOLOGICAL MUSEUM, VARANASI.— The museum acquired framentary stone sculptures, *viz.,* two Buddha head (fifth-sixth century AD), head of Siva (tenth-eleventh century AD) and a portion of hand of a goddess (tenth-eleventh century AD). Besides, sixteen paintings, one manuscript, a *hukka* base, one silver bangle and four items of textile were also accessioned by the museum, during the period under review.

36. ARCHAEOLOGICAL MUSEUM, VAISHALI.— All the galleries of the museum were painted.

VIII. ARCHITECTURAL SURVEY

TEMPLE SURVEY, NORTHERN REGION.— The Temple Survey Project (Northern Region) under B.L. Nagarch, continued the work of architectural survey of the temples of Paramaras. The Udayesvara or Nilakanthesvara Mahadeva temple, Udaipur in District Vidisha, the Siva temples at Petalavad, Bhagor and Kalivel, the ruins of Jaina and Ganesa temples at Kheda, the Siva temple at Ali, all in District Jhabua and the Siva temple at Deora in District Dhar were surveyed and studied.

The Siva temple, also known as Phoota Mandira, at Petalavad built by the Paramaras of Malwa in twelfth century, is *saptaratha* on plan and in elevation. Dedicated to Siva it faces west and on plan consists of a *saptaratha* sanctum, an *antarala,* a *sabha-mandapa* with lateral transepts and an *ardha-mandapa.* The *ardha-mandapa* is approached by a flight of four steps on the west. The ceiling of the *ardha-mandapa* rests on four dwarf pillars each consisting of a plain square base, an octagonal and circular shaft and a capital consisting of a circular cushion and *padma* supporting plain brackets with a single volute. The brackets support the architrave of the ceiling showing three plain offsets. The ceiling has collapsed. However, three ceiling stones are seen in their proper position, each of the four dwarf pillars of the *ardha-mandapa* rests on a *asanapatta* supported by four pilasters on each side.

The *sabha-mandapa* has a central hall, the ceiling of which is supported by four tall pillars. The ceiling consists of three diminishing squares, arranged one above the other, and is decorated on the top with a full-blown lotus. Around the central hall of the *sabha-mandapa* there is a gallery on all the four sides. The ceiling of this gallery is divided into three compartments on each of the four sides. Thus the ceiling of the *sabha-mandapa* is divided into thirteen compartments including the ceiling of the central hall. The ceiling of the entire *sabha-mandapa* rests on fourteen pillars and two pilasters. On all the four sides of the gallery *of sabha-mandapa* is an *asanapatta* supported by a dwarf periphery wall. On either side of the *sabha-mandapa* is a lateral transept, the ceiling of which is plain and flat and is supported by four dwarf pillars similar in design and ornamentation to the dwarf pillars of the *ardha-mandapa.*

The ceiling of the *antarala* rests on two pilasters, each of which has a square base consisting of *kumbha, kalasa* and *kapota* and is decorated on three faces with a *chaitya-arch.* The base supports the shaft which is plain in the lower portion and is decorated with two bands in the upper portion. The lower band consists of *chaitya-arches* while the upper band is composed of *tamalapatras.* The shaft supports the capital which consists of a cushion and *a padma* and is surmounted by a plain bracket with a single volute. The brackets support the architrave of the ceiling carved with two friezes. The architrave supports the flat ceiling which is decorated with three full-blown double lotuses. The northern and southern walls of the *antarala* are plain and have each a niche. The niche in the southern wall contains, at present a modern image of seated two-armed Ganesa, while the niche in the northern wall is lying vacant.

The sanctum-doorway consists of three *sakhas.* The first *sakha* is carved with *padmalata,* the second *sakha* is plain while the third *sakha* is a *rupastambha* decorated with three bands, of which the

lower one is carved with *chaitya*-arches, the middle one is engraved with diamonds and the upper one is embellished with *tamalapatras.* While an image of seated four-armed Ganesa occupies the lintel of the sanctum-doorway on the *lalatabimba.*

The walls of the sanctum are plain and plastered with cement in modern times. The ceiling of the sanctum rests on ten brackets and is of *nabhichchhanda* variety. The collapsed upper portion of the ceiling was repaired in modern times. The ceiling is decorated on each of the four corners with a bold *kirttimukha.* At present only three concentric overlapping rings of the ceiling have survived. The sanctum enshrines a *Siva-linga* installed on a circular *yonipatta.* There is a niche in the eastern wall of the sanctum which has been repaired with cement plaster in recent times and contains at present a modern image of four-armed male deity standing in *samapada.*

In elevation the temple shows from bottom upwards *pitha* and *adhishthana* mouldings surmounted by *jangha* which is decorated in the upper portion with two bands. The lower band is carved with *chaitya-arches* while the upper one is embellished with *tamalapatras.* The *jangha* had a *bhadra* niche on the northern, eastern and southern sides of the sanctum. However, the *bhadra* niches on the southern and eastern sides have collapsed and are missing while the *bhadra* niche on the northern side has survived in a dilapidated condition. The *jangha* is surmounted by *varandika* mouldings which consist of a *karnika* and double *kapota.* Above this rests the *kutachhadya* which is decorated with lotus petals. The *varandika* mouldings supported the *sikhara* above the sanctum which has collapsed and is missing. The temple is of *bhumija* style and has all the features of the style. The original roofs of the *ardha-mandapa- sabha-mandapa* and sanctum are missing. The *vedika* moulding of the *ardha-mandapa* and *sabha-mandapa* shows niches containing images of deities such as Uma-Mahesvara, Siva and Ganesa. A number of loose sculptures and architectural fragments are lying around the temple. Noteworthy among them is an image of four-armed Sarasvati seated in *lalitasana* on *a padmapitha.* The temple built of white sandstone, is assignable to later part of twelfth century.

The Siva temple at Bhagor belongs to the reign of Paramaras of Malwa and was built in the eleventh century (pl. LXI). It is built of white sandstone and at present is in a dilapidated condition. On plan the temple consists of a *saptaratha* sanctum, an *antarala* and a *sabha-mandapa,* but, only the sanctum has survived. The *antarala* and *sabha-mandapa* have completely collapsed and disappeared. The temple stands on an elevated platform on the southern bank of a large tank.

The sanctum enshrines a *Siva-linga* installed on a *yonipatta,* the interior of the sanctum is plain. There are three large doorways on the western, southern and northern sides of the sanctum. Each of these doorways is closed on the rear side. There was a niche carved inside the western doorway which has been chopped off. There are two modern images, one of Siva and the other of Parvati which are, at present, kept inside the niche. The temple faces east and the sanctum is approached through a doorway from the eastern side.

The architrave of the ceiling of the sanctum is richly carved with four friezes. Starting from the lower most and proceeding upwards the friezes show diamonds in panels, *hamsas,* stencilled lotus creeper and cut-triangles. On each of the four corners of the ceiling is carved a bold *kirttimukha.* The ceiling is of *nabhichchhanda* variety and consists of eleven bands of concentric overlapping circles decorated with *kola* and *gajatalu* courses. The top of the ceiling is carved with *a padma.* The sanctum-doorway is in dilapidated condition. Its jambs are missing.

In elevation the temple shows from bottom upwards *pitha* mouldings consisting of three plain *bhittas, kharasila, jadyakumbha, karnika* and a *grasapattika*. The *pitha* mouldings support the *adhishthana* mouldings consisting of plain *khura, kumbha* decorated with a median band of diamonds and rosettes and a panel containing a diamond design, *kalasa, kapota* decorated with *kudus* and *manchika.* Above this rests the *jangha* carved with two bands, the lower one showing *chaitya-arches* and the upper one portraying *tamalapatras.* There is a *bhadra-niche.* on the southern; western and northern sides of the sanctum on the *jangha.* The *bhadra* niches on the southern and northern facades are in dilapidated condition. The *bhadra* niches on the western facade contains an image of eight-armed dancing Siva.

The *jangha* is surmounted by *varandika* mouldings consisting of ribbed *padma, kapota* decorated with *kudus, kuta-chhadya* and *kapota* engraved with *kudus.* Above this rests the *bhumija sikhara* of which only the portion on southern side has survived. From the existing portion of the *sikhara* it is evident that it had four spines decorated with usual mesh of *chaitya*-dormers on the central *rathas* and the quadrants in-between the spines were filled with minature shrine models of diminishing height arranged in three horizontal and five vertical rows. The *samvarna* roof of the *sabha-mandapa* has also collapsed and its fragmentary *kutaghantas* are lying at the site. The temple is notable for its *bhumija* style of architecture.

The original Siva temple and *kunda* at Kalivel are assignable to twelfth century and were built during the reign of Paramaras. The present temple is modern, built at the site of an ancient temple of the Paramara period. Some of the ruins of the original temple are lying in the compound of the modern temple. Notable among them is an image of four-armed Mahishamardini in two pieces-carrying *trisula, khadga, khetaka* and chopped off. The lion (mount) is seen attacking the buffalo from behind. The image is made of white sandstone.

On the east of the temple lies a stepped *kunda.* In the western wall of the *kunda* are fixed four images. One of the images depicts a standing four-armed Parvati in *samapada,* carrying *varada,* lotus-stalk with *Siva-linga,* lotus-stalk with seated Ganesa *and kalasa.* The other images is that of four-armed Brahma standing in *samapada,* carrying *varada, sruk, pustaka* and *kalasa.* He is flanked on either side by a male and a female attendant both standing in *tribhanga.* The third image shows two male figures both standing in *samapada* while the fourth one is of seated Nandi.

The Jaina temple at Pithanpur, of which only the ruins have survived, is assignable to thirteenth century AD. It is evident from the ruins that the temple was of *bhumija* style. Noteworthy among the ruins are seated and standing images of Jaina Tirthankaras (pl. LXII A) wearing *kaupina,* an image of four-armed Ambika seated in *lalitasana* on a lion (pl. LXII B) and a miniature shrine model of a *bhumija sikhara.* The images of Tirthankaras include those of Parsvanatha, Neminatha and Mahavira. Three Tirthankara images bear inscriptions dated VS 1288 (AD 1231). All these images are made of white sandstone and belong to the Svetambara sect.

The ruins of a Ganesa temple, assignable to thirteenth century, have also been recovered from Pithanpur. Noteworthy among them are architectural fragments of the *adhishthana* mouldings, *sikhara,* panels containing diamonds and bases and capitals of pillars and pilasters. Four images of Ganesa of which one is standing in *tribhanga* and the remaining three seated in *lalitasana* are also lying at the site.

The Ganesa temple at Kheda, also in Jhabua District, is in ruins. Noticeable among the ruins are the architectural fragments of *adhishthana* mouldings and the fragments of the *kutaghantas* of *samvarna* roof of the *sabha-mandapa* of the temple. Most important among the ruins of the temple is an image of four-armed Ganesa standing in *tribhanga* and carrying *parasu, ankusa, pasa* and *modakapatra.* The other sculpture shows Siva-Parvati seated in *lalitasana.* Two circular *yonipattas* without Siva-*linga*, a *nandi* seated on a pedestal and a *Siva-linga* installed on a circular *yonipatta* are also lying scattered on the site. From the ruins it is evident that the original temple belonged to the reign of the Paramaras of Malwa and is assignable to twelfth century.

Ali is an ancient site in Alirajpur tehsil of Jhabua District. Originally there was a Paramara temple of thirteenth century, dedicated to Siva at Ali which had later collapsed. The Paramara temple was located on the western bank of a water-spring. During the Maratha period in seventeenth century two more Siva temples were built here re-using some of the material of collapsed Paramara temple and the original Paramara temple which was built of ashlar stone masonry was repaired extensively.

The repaired Paramara temple, on plan, consists of a sanctum and a closed *sabha-mandapa.* The walls of the sanctum are plain and the architrave of its ceiling is supported by four plain brackets, one at each of the four corners. The ceiling consists of four overlapping diminishing squares and is decorated on the top with a full-blown lotus. To the western wall of the sanctum is attached a platform on which stone images of fourteen-armed dancing Siva, four-armed standing Vishnu, four-armed seated Ganesa and eight-armed Andhakantaka Siva are kept. These images belong to the original Paramara temple and are assignable to thirteenth century.

The sanctum-doorway is plain and shows three *sakhas.* The figure on the *lalatabimba* is indistinct. The walls of the *sabha-mandapa* are plain and have a large open window on the northern and southern sides. There is an *asanapatta* fixed on the parapet wall running all through the *sabha-mandapa.* The ceiling of the *sabha-mandapa* rests on four plain pilasters surmounted by plain brackets. The brackets support the architrave of the ceiling carved with two friezes, the lower one showing spiral lotus-scrolls and the upper one depicting cut triangles. Above the architrave rests the ceiling which is decorated with a frieze of scrolls and cut triangles. The ceiling is plain and flat and is carved with two lotuses. The *sabha mandapa* has a doorway on the east which is approached by a flight of three steps.

In elevation the temple shows plain exterior walls surmounted by a *chhadya* on eastern facade. The *sabha-mandapa* has a flat roof while the sanctum is crowned by a dome. In front of the windows on the northern and southern facades of the *sabha-mandapa* are provided projecting stone lintels supported by two plain brackets. The temple has so extensively repaired that it looks like a temple of seventeenth century. The temple has some Maratha paintings. The architectural fragments of the original Paramara temple are lying around the site. Among them could be noticed fragment of a pillar decorated with two bands of cut triangles and *kirttimukhas* and another fragment of a pilaster carved with a band of *chaitya*-arches and a frieze of *kirttimukhas.*

The Siva temple at Deora, in District Dhar, is built of white sandstone masonry and is assignable to thirteenth century (pl. LXIII). On plan it consists of a *saptaratha* sanctum, an *antarala,* a *sabha mandapa* with lateral transpets and an *ardha-mandapa.* The *ardha-mandapa* and *sabha-mandapa* have completely collapsed and their ruins are stacked at the site. The temple has all the features of a *bhumija*

style. The *sikhara* above the sanctum was of *bhumija* variety and showed four spines decorated with usual mesh of *chaitya*-dormers on the central *rathas.* The quadrants in-between the spines were filled with miniature shrine models of diminishing height arranged in five horizontal and seven vertical rows. However, the ceiling of the sanctum and the *sikhara* above it have completely collapsed. The temple showed a prominent *sukanasa* exhibiting a medallion within a conspicuous *chaitya*-dormer at the base of each spine on the four sides. The ruins of the *roof of sabha-mandapa* are also seen lying around the temple and it is evident from them that it was hollow inside. The sanctum was approached by a flight of two descending steps from the door-sill of the sanctum.

The sanctum-doorway consists of seven *sakhas* and shows on the *lalatabimba* a small niche containing an image of four-armed Ganesa seated in *lalitasana.* The lower portion of the *sakhas* are richly carved with figure sculptures of river goddesses, female attendants, *saiva-dvarapalas* and Kubera. Above the sanctum-doorway are shown nine niches containing images of *sapta-matrikas* flanked on the left by Ganesa. Above the central niche containing Virabhadra is shown another niche containing an image of two armed Lakulisa seated in *padmasana* and carrying *matulunga* by his left hand.

The ceiling of the *antarala* is flat and is supported by two richly carved pilasters. The lower portion of the shaft of the southern pilaster is carved with an inscription of four lines in Sanskrit language and Devanagari characters. It is dated VS 13 10 (AD 1253). There is another inscription of two lines in Sanskrit language and Devanagari characters. It is dated VS 1400. The ceiling of the *antarala* was decorated with three full-blown lotuses of which the central one had collapsed.

The super-structures of the *sabha-mandapa* and *ardha-mandapa* have completely collapsed and their ruins are stacked in the compound of the temple. The floors of the *sabha-mandapa* and its lateral transepts and *ardha-mandapa* are in a ruined condition. The ceiling of the *sabha-mandapa* was supported by a number of pillars and pilasters of which only two pilasters on the western side attached to the *antarala* have survived. The *ardha-mandapa* is approached by a flight of eight ascending steps on the east towards which side the temple faces.

The temple stood on a spacious platform. In elevation, the temple shows from bottom upwards *pitha* and *adhishthana* mouldings, *jangha, varandika* mouldings and *sikhara.* The *pitha* mouldings consists of two plain *bhittas, kapota,* decorated with *kudus, karnika, antarapatra* and a plain *pattika.* On each of the *bhadras* of the southern, western and northern facades is carved a large *chaitya-* arch containing a *ratnakuta* motif.

Above the *adhishthana* mouldings rests the *jangha* which has survived only on the northern and southern sides of the walls of *antarala. "[he. jangha* is decorated with two bands of which the lower one is carved with *chaitya*-arches and the upper one shows *tamalapatras.* The recesses of the *jangha* are decorated with *ratnakuta* motif. The stone slabs of the *jangha* are missing on all three sides of the sanctum. *The jangha* supports the *varandika* mouldings which comprises a *karnika,* double *padma* and a *ratnapattika.* Above *varandika* moulding rests the *sikhara* of which only the exposed core has survived.

Among the ruins of the temple kept in the compund of the temple, could be noticed fragments of pillars, pilasters, *jangha* stone slabs, niches, *sikhara, amalaka,* pillar capitals and brackets.

In addition to this, the temples and their architectural and sculptural ruins in Maraguda valley, District Kalahandi, Orissa were also surveyed. The following temples were noticed. Temple 1 stands on a platform and is built of stone ashlar masonry. It is in dilapidated condition which consists of a sanctum and an *antarala* on plan. Only three plain courses of the *pitha* mouldings of the sanctum and two courses of the same mouldings of *antarala* have survived. The sanctum measures 4.40m square. There is no image inside the sanctum at present. The *antarala* measures 0.80m long and 4.10m broad. The temple faces east and is assignable to tenth century. Temple 2 is built of brick masonry and on plan consists of a sanctum with circumambulatory. The sanctum measures 2.84m long, 2-lm broad and 0.90m high. There is a rubble stone enclosure wall around the temple. At present, however, there is no image inside the sanctum.

In the Puchipada locality of Maraguda village are lying some fragments of *adhishthana* mouldings of a temple assignable to tenth century. There are two brick temples at Trisula Dhara. Of these Temple 1 faces east and on plan consists of a rectangular sanctum, an *antarala* and a *mandapa.* To the rear wall of the sanctum is fixed a pedestal of purple sandstone carved with three mouldings. The pedestal has a rectangular socket in the centre which is meant for installing an image of Mahishamardini. However, the image of the goddess is kept at present on the southern side of the pedestal, the recess of which is carved with seven Brahmi alphabets reading *'Mahesvari Bhavada'.* The image of Mahishamardini is also made of purple sandstone and is assignable to Kushana period on the basis of its stylistic features. The sanctum doorway is built of stone and is in dilapidated condition. The *antarala* is made of brick masonry. The *mandapa* was provided with a stone doorway on eastern side. There was a circumambulatory path around the sanctum. In elevation, the temple shows a plain brick wall. The temple built in the tradition of brick temples of Chhattisgarh region of Madhya Pradesh, is dedicated to Mahishamardini and belongs to tenth century.

On the south-east of the Mahishamardini temple is a monastery built of brick masonry, consisting of a central courtyard with rooms arranged on the northern, eastern and southern sides. The monastery is contemporary in date with the Mahishamardini temple as could be seen from the same size of bricks used in the monastery.

There is another monastery located near the foot of the hillock of which Mahishamardini temple stands. It is also built of brick masonry having a central hall surrounded by a row of rooms on the periphery.

On the north of this monastery is located Temple 2, a Siva temple built of brick masonry. However, stone was also used in the construction of the door-frames. The temple stands on the western bank of Jonk river and faces east. The temple was approached by a flight of twenty steps on the north-eastern corner. It is of *saptayatana* variety, i.e., the main shrine in the centre surrounded by six subsidiary shrines on the periphery of the courtyard in which the temple stands. The main shrine facing east, consists of a sanctum, an *antarala* a *sabha-mandapa* and an *ardha-mandapa* on plan. The sanctum enshrines a *yonipatta* in the centre and was provided with only one doorway on the eastern side. The sanctum measures 3-30m square. The steps seen on the western, northern and southern sides of the sanctum belong to the three niche shrines which were attached to three sides. These niche-shrines are in dilapidated condition, without an image inside. The *antarala* measures 1.15m long and 7.00m broad.

The *sabha-mandapa* is a spacious hall and measures 6-70m square. It had a central hall. However, the pillars of the central hall are not in position at present. The *ardha-mandapa* measures 2.41 m long and 4-00m broad.

There are six subsidiary shrines, three each on southern and northern sides of the main shrine. All of them are in dilapidated condition. Among other ruins of the temple lying scattered at the site, stone pilasters and pillar capitals are noteworthy. It is evident that this temple was of great importance to the Saivites and Saktas which is assignable to tenth century. On the east of Jonk river is lying a Siva-*linga* made of granite. The *linga* belongs to a Siva temple of tenth century.

The Chandika temple is located on a hillock to the south of Maraguda valley. The temple is built of brick masonry and consists of a sanctum, an *antarala* and *mandapa* on plan. It is in a collapsed condition with debris lying on the site. Besides bricks, stone was also used in the construction of the temple. At present ten pilasters of stone are lying inside the sanctum. The sanctum measures 2-70m square but inside no image is there at present. A *Siva-linga* from Trisula Dhara in Maraguda valley has been brought to Nawapada town which is under worship.

From the ruins of the Kalachuri temples and sculptures recovered from Maraguda valley, it is evident that the Kalachuri kings had beautified it with a number of temples. The Trisula Vihara in Maraguda valley is a *Saiva* monastery built on the pattern of Buddhist viharas.

Besides, the recently unearthed temples at Bhait Bari Wadagokugiri), District West Garo Hills, Meghalaya were also surveyed. Temple 1 facing west, dedicated to Siva is located in the Wadgokugiri village. It has been uncovered during the course of excavations. The temple consists of *a pancharatha* sanctum an *antarala,* a *sabha-mandapa* and an *ardha-mandapa* and is built of brick masonry. The sanctum measures 2.50m square. Only seventeen courses of bricks of the wall of the sanctum have survived on the northern side. The sanctum enshrined a *Siva-linga* installed on a circular *yonipatta.* However, at present only the circular plinth of *the yonipatta* has survived. The *antarala* measures 0-70m long and l.80m broad. The *sabha-mandapa* is *pancharatha* on plan and in elevation and measures 5.10m square. The *ardha-mandapa* measures 3.35m long and 2-90m broad. In elevation the temple shows a plain wall upto a height of 65cm. Above this are niches in which terracotta panels were fixed. However, the terracotta panels have been removed from their original position. These panels show seated Ganesa, standing Sarasvati playing on *Vina, Saiva ganas* in various postures and *surasundaris* in dancing postures playing on *mridanga,* etc. On the basis of style, terracotta panels and the temple are assignable to first half of the seventh century. The temple was constructed wholly of bricks and continued the brick tradition of Gupta temples in the region.

Temple 2 also located in Wadgokugiri village, is dedicated to *navagrahas.* The plan of the temple is peculiar as it resembles a wheel with eight spokes, each spoke having a shrine. In the centre of the wheel or hub portion was installed *Siva-linga.* Thus in all there were nine *Siva-lingas,* each installed on a *yonipatta* in the temple. Each of these nine *lingas* represent one of the Navagrahas. The temple has eight independent shrines each consisting of a *garbhagriha,* a *mandapa* and an *ardha-mandapa* all within a single circle. The diameter of the circle in which each of these eight shrines are located measures 14.28m. The temple is assignable on stylistic grounds to the middle of seventh century AD. The temple has been uncovered during the course of excavation.

Among other architectural fragments of stone temples at Wadgokugiri could be noticed fragment of the *jadyakumbha* moulding, fragment of a *saptaratha sikhara* crowned by an *amalaka, chandrika, kalasa* and *bijapuraka,* fragment of a large *amalaka,* a circular *yonipatta,* fragment of a *pancharatha sikhara* and fragment of a *bhumi-amalaka.* These fragments belong to stone temples at the site and are assignable to seventh-eighth centuries AD.

In the bed to Inchigudi stream, near Wadgokugiri was noticed a rock-boulder on which is carved a sketch depicting the elevation of a temple. This elevation design gives us an idea of the temples which existed at the site. This sketch was prepared by the architect before starting the construction of the temple. From the sketch it is evident that *jangha* portion of the temple was also decorated on the top with lotus-petals. The *jangha* was surmounted by a curvilinear *sikhara* which was decorated at the corners with *bhumi-amalakas.* As the upper portion of the rock-boulder, on which this sketch is carved, has been chopped off and is missing; it is not possible to indicate with certainty about the crowning members of the top of the *sikhara.*

Though the excavations at Bhait Ban, have revealed only the plinths and basements of the temples, conjecture of their super-structures and elevations could be made from the sketch found engraved on the rock-boulder. The temples had a basement or *adhishthana,* a wall *or jangha* and a curvilinear *sikhara* crowned by *griva, amalaka, chandrika, kalasa* and *bijapuraka.* The site is important for the study of temple architecture of Meghalaya during early medieval period.

TEMPLE SURVEY, SOUTHERN REGION.—The Temple Survey (Southern Region) continued the survey of Chola temples in District Mysore}During this period, preliminary survey of temples in two taluks, *viz.,* T. Narsipur and Chamarajanagara was undertaken. The Janardanaswamy temple of Chola period, in Tadimalingi, T. Narsipur taluk, now in ruins, contains inscriptions of Rajaraja Chola I, Rajendra Chola I and Rajendra Chola II. Another temple in the same taluk, e.g., Mahalingesvara also of the same period is in dilapidated condition and bears the inscription of Rajendra Chola I. The ruined Desevara temple at Hale Alur in Chamarajanagara taluk has the inscription of Rajendra Chola II. The shrine of Suryanarayana in front of Arkesvara temple at Vijayapura in T. Narsipur taluk also contains the inscription of Rajendra Chola I.

BUILDING SURVEY.— The Building Survey Project of the Survey under H.N. Singh assisted by Daljit Singh, C.P. Satsangi, J.B. Chand, Sudhir Kumar and K.K. Verma undertook the architectural survey and documentation work of the buildings in the following states.

The architectural remains at village Pethapur (23° 13' N; 70° 33' E), District Ahmedabad in Gujarat were surveyed and documented. The exquisite carvings on some of the wooden structural parts of the timber brick constructions are the main features of the cluster of the old residential houses and are exhibited in the form of carved beam ends, struts, pillars, capitals, friezes, balustrades, door jambs, window panels, etc. (pl. LXIV). The wooden pillars exhibit intricate carved pedestal and fluted shafts, surmounted by ornate capitals decorated with beaded and foliage designs (pl. LXV A). The friezes are bordered with floral or foliage designs encircled with beaded filletings (pl. LXV B). The cantilevered first floor is supported by beam ends and struts displaying *vidyadharas* and *sardulas* respectively, struts at times are supported on floral pedestal (pl. LXVI). The wooden architecture of the area exhibits the symbiosis Hindu, Mughal and Colonial styles. Considering the constructional style, the kinds of

building materials used and their present state of preservation, these old houses of Pethapur appear to have been built sometimes during eighteenth century AD.

Ramji-Mandir, a *haveli* temple, is built on a raised stone plinth and is entered through an arched gateway. On plan, it consists of a narrow *otlo,* a central open courtyard surrounded on three sides by verandahs preceeding the rows of rooms.

This building is noted for its wooden pillars, struts having excellently carved *gaja-vyala* and *sardula,* carved brackets and plain beam. It has undergone renovations but has still retained original features, which are probably borrowed, from Maratha and Mughal style of architecture.

Several secular buildings were inspected at Jaipur city including Amber and Ranthambhore forts in Rajasthan. At Amber, the ruins of the contemporary township in the form of old structures are seen scattered all over the lower ridges and along the hill slopes. In the adjoining valley area, a few large *havelis* are seen situated, which have a number of decorative and architectural features like domes, pitched roofs, arched openings fixed with *jalis*, etc. The *haveli* of the royal priest in the Lai-Bazar area offers details of decorative elements which remind the high degree of craftsmanship existing at that time.

At Jaipur city, *havelis* on the main streets are used for residential-cum-trading purposes. Sometimes these are found used for religious purpose also, commonly known as *haveli*-temples. The salient architectural feature of these mansions are projected balconies supported by decorated brackets, *jharokhas, chhatris,* bastions, Bengal roofs, *chhajjas,* arched entrance, pillared pavilions, battlemented parapets, etc. The facades of the *havelis* are decorated with paintings or carvings on stone, plaster, etc. The themes of paintings are religious or secular.

The various *chhatris* surveyed and documented at Ranthambhore fort, District Sawai Madhopur, were made and used for varying purposes. In some *chhatris* are lying the images of gods, while others might have been used as *samadhis.* These small and big *chhatris* are carrying plain or ornamented pillars, cave stones, domes and miniature pinnacles. The Sukh-Sagar is artificially made water tank with steps along the sidewalls. The Padam-Sarovar accomodates a number of ruined structures on its banks, while Kala-Sagar maintains a natural profile.

The medieval *serai* at village Khajuha, District Fatehpur in Uttar Pradesh, has two huge arched gateways, pierced by a road which divides the walled enclosure of the *serai* into two halves. This structure, set in lime mortar, with *lakhauri* bricks, has an arched entrance under a big recess on either ends with a battlemented parapet and circular minarets, one on each side and topped by circular domes. The cells along with enclosure walls now stand converted into rooms. By the side of the *serai,* a ruined gateway near Siva temple is betraying fish design painted on the spandrel of the cusped arch, which is characteristic of Oudh art and architecture.

The extant portions of a dilapidated medieval *haveli* in Shuklan-gali consist of brick walls, doorframes, *chhajjas* supported on wooden brackets, etc. It shows simultaneous development of wooden art and stucco work in the area.

The medieval house of Narender Prasad Gupta is typical with regard to its plan and three storeyed elevation.

Some of the medieval temples in the area were documented due to their typical features in respect of their plan, elevation and decoration. The Chhadmbe-shwar-Shankar temple is dedicated to lord Siva. Built on a raised plinth, the octagonal structure has a high dome above circular drum and is topped by *kalasa* finial resting on an inverted lotus base. The carvings on the wall surface and paintings on ceiling are excellent specimens of art of the area. The entrance doorway of Ranam-talab temple has exquisite carivngs on doorjambs- arches, pilasters, etc. These medieval temples of Khajuha are approximately datable to the beginning of the eighteenth century AD.

IX. PRESERVATION OF MONUMENTS

MONUMENTS OF NATIONAL IMPORTANCE

Agra Circle

UTTAR PRADESH

1. AGRA FORT, AGRA, DISTRICT AGRA — During the course of repairs to the fort wall near Delhi gate, the work of underpinning was done with *lakhauri* bricks using the cement, lime, *surkhi* and sand mortar in the ratio of 1:1:2:4 at several spots. The old decayed veneering of red sandstone of the fort wall was replaced by providing fresh veneering following the original pattern. Further, stained cement pointing was done to the open joints of red sandstone veneering. In the lower fortification wall near the fifth bastion to the west side of Amar Singh Gate, carved stone work was done at the battlemented merlons *{kanguras).* Similar repairs were carried out in the fifth bastion of the fort wall.

Conservation of verandah, gallery, pillars of verandah, etc., of the Diwan-i-Khas complex was attended to by way of plastering with special lime mortar at places where the old plaster was missing. Plain plaster work was done in cement, lime, *surkhi* and sand mortar in the ratio of 1:1:2:4 on the parapet bordering the roof and above the the *chhajjas* of the Diwan-i-Khas.

Conservation work in the Diwan-i-Am was attended to by way of plastering the ceiling and bases of pillars with special lime-mortar mixed with white cement. The undulated and decayed red sandstone flooring was replaced and restored as per original.

2. JAMA MASJID, AGRA, DISTRICT AGRA.— The *chhajja-stones, farrandah-stones* (a frieze over the *chhaja)* and stone brackets were provided in the *dalan* facade of the southern side (facing the courtyard) and of a *chhatri* of Jama Masjid following the existing pattern. The mortar used was in the ratio of 1 cement: 1 lime : 2 sand : 2 *surkhi.*

3. FIRUZ KHAN'S TOMB, AGRA, DISTRICT AGRA.—The compound wall was repaired by underpinning with *lakhauri* bricks. Inner face of the compound wall was plastered and the moulded portions over the arches were restored. Roof-concreting was also done.

4 KALI MASJID, AGRA, DISTRICT AGRA.—The western side wall of the mosque was repaired by underpinning with *lakhauri* bricks and plastering with lime mortar.

5. ROMAN CATHOLIC CEMETERY, AGRA, DISTRICT AGRA.— The compound wail was repaired by underpinning with *lakhauri* bricks. The outer face of the compound wall was plastered.

6. SAHELI BURJ (NEAR TAJ), AGRA, DISTRICT AGRA.— The modern brick-floor in front of north western Saheli Burj was dismantled and cleaned for laying out a garden. The red sandstone floor around the main dome was repaired by filling up of the joints to prevent the vegetation growth. Richly carved

moulded *jali*-panels were prepared for fixing in the railing wherever missing. Marble pinnacles were provided in the *guldastas* wherever missing.

7. TAJ MAHAL, AGRA, DISTRICT AGRA.— To protect the iron dowels from moisture and to avoid vegetational growth, the open joints of white marble veneering of the northern and western facade of main mausoleum were watertightened by pointing with special lime mortar. The roof-terrace was also watertightened with cement sand mortar to avoid any leakage. The parapet built in red sandstone and marble at the roof terrace was also watertightened. The inlay work of the facade was attended to by providing the missing inlay pieces.

The red sandstone veneering of the facade of the Mehmankhana had become loose at certain places, resulting in the chipping off and subsequent fall of two carved sandstones of the western facade. New stones matching the original were provided (pl. LXVII). To check any further loss of veneering the open joints in north side veneering were filled in with special mortar matching the original colour. The inlaid marble stones over the arches which were found to be loose were conserved by resetting with special lime mortar. For the safety of the monument copper lightening conductor was provided to its main dome.

The copper lightening conductor was also provided in the mosque to prevent damage against lightening. The red sandstone veneering of the western facade alongwith the arches of the main entrance gateway was found to be adversely affected due to weathering iron dowels. The decayed stone of these panels including disturbed marble inlay pieces were replaced by fresh ones. The work is still in progress. The decayed stones of moulded *dasa* of southern side plinth were replaced by fresh ones. The five archways of the *dalan* to the east of main entrance gate (facing forecourt) were closed with mild steel grill provided with glass window panels with a view to having a cloak-room as a facility for the visitors. The marble stone in panels damaged due to iron-dowels was replaced in the main gate facing south (pl. LXVIII).

The decayed plaster of the walls of rooms and verandah on northern facade of the Glass House Nursery was removed and cleaned wall-surface was replastered. The missing lime concrete floors of rooms was relaid. The work is in progress. Apart from the above, a barbed wire fencing to the north of the whole monument along the river side was provided for the safety of the monument since the earlier fencing had submerged in flood deposits.

8. GROUP OF MONUMENTS, FATEHPUR SIKRI, DISTRICT AGRA.— The missing floor in between the Jodha Bai palace and Birbal's palace was paved with dressed red sandstone slabs and the joints were filled in with cement-sand-mortar, mixed with pigment matching the stone colour.

The Mint building *(Kar khana)* was attended to by way of underpinning the walls and removal of vegetation alongwith roots. The open joints of stone masonry in walls were filled in with the mortar made of lime, cement, *surkhi* and sand. The vaulted brick masonry ceiling where the original plaster was missing or had decayed was replastered wherever necessary with the simple moulded plaster.

The tilted wall of the *hammam* near the Buland Darwaza on north side had partly collapsed during the rainy season. The collapsed wall was dismantled and reconstructed with stone masonry laid in lime

mortar. The west side wall of the *hammam* was strengthened by underpinning with stone masonry and the open joints on the outer facade were filled in with lime mortar. The vegetation over the roof was removed and cracks filled in with lime mortar. To stop the misuse of the *hammam* by local people, the door openings were closed with iron grilled doors and G.I. barbed wire fencing was provided along the road side.

The excavated remains to the west of Birbal' s palace were conserved by removal of vegetation and filling the joints of the stone masonry walls. The top of the walls were also watertightened with lime mortar.

Vegetation was cleared from the walls and the roof of the Baradari near Terha Darwaza (Todarmal ki Baradari). The stone masonry walls were repaired by underpinning and filling the open joints.

The road in between Diwan-i-Am and Badshahi Gate was re-carpeted after filling the pot-holes. The guard walls which were partly damaged during rains along the PWD road towards Buland Darwaza and around the car park in front of booking counter near Jodhabai palace were reconstructed in stone masonry and lime mortar.

The bathrooms of the Room 3 and 6 of the Dak Bungalow were provided with flooring of glazed tiles and the decayed plaster of the walls was removed and the surface is replastered with cement-sand-mortar. The walls were also painted with oil bound distemper for a better look.

9. AKBAR'S TOMB, SIKANDARA, AGRA, DISTRICT AGRA.— Restoration of north side causeway by way of providing flagstone-flooring and its edging with moulded *dasa-stone* was in progress. Likewise, repairs to western causeway were also in progress. Plastering work was done in western side tank and stained cement pointing in floor.

10. GROUP OF TEMPLES, JAGESHWAR, DISTRICT ALMORA.— The bulged and tilted walls of the *kund* were dismantled and reconstructed in cement sand mortar. Silt was removed from the base of the chamber. Finally, a 0-5 m high angle iron railing was provided for safety and better look.

The roof of the *sabha-mandapa* of the Mrityunjaya temple was leaking during rains due to porosity of roof-stones. To stop water-percolation, 30 cm thick terro-concrete was provided. Besides, two tilted sub-shrines were restored to their original shape by resetting.

The loose and decayed stones of the vaulted roof of the Pushti Devi Temple were replaced by fresh ones and cement sand mortar in 1: 3 ratio was laid to check water percolation.

11. DANDESVARA GROUP OF TEMPLES, KOTLI CANDHAK GUNTH, DISTRICT ALMORA.— The retaining walls on the eastern and southern sides and protection wall on the western side of the Kubera temple were built. The high earthen heap on the northern side was levelled and one metre wide stone apron was provided all round the temple.

12. DARGAH OF IMAD-UL-MULK AND NAI KA GUMBAD, BUDAUN, DISTRICT BUDAUN.— Patch-plastering of dome was attended to. Watertightening of roof was done by laying mixture of brick ballast, lime, cement, sand and *surkhi*. Besides, the parapet wall was also repaired.

13. IKHLAS KHAN'S TOMB, BUDAUN, DISTRICT BUDAUN,— Plastering was done in the walls of the tomb wherever missing. Patch plastering of domes was also attended to. The dilapidated compound wall was rebuilt.

14. EXCAVATED SITE, JAGATGRAM, DISTRICT DEHRADUN.—Compound wall in course-rubble stone using cement mortar was erected to a height of 1-2 m on two sides of the excavated area (plot 1,2 and 3). A breast-wall was also provided and watertightening the excavated remains completed. Vegetation clearance was also attended to.

15. MOSQUE AND TOMB OF SHAIKH MAKHDUM JAHANIYA, KANNAUJ, DISTRICT FARRUKHABAD.— The entire dome was deplastered and replastered with cement, lime, sand and *surkhi* mortar to check water-leakage. The uneven floor of open courtyard was dismantled and relaid with a mixture of brick-ballast, lime, cement, sand and *surkhi.* In the graves and walls the work of underpinning with *lakhauri* bricks was attended to. Recess pointing was done in stone veneering of the walls.

16. MOSQUE AND SARAI AT KHUDAGANJ, DISTRICT FARRUKHABAD.— Underpinning of back-wall of mosque with *lakhauri* brick was done; watertightening the roofs of the cells of the Sarai by laying brick-ballast mixed with cement, lime, sand and *surkhi* was also earned out. Decayed plaster was removed from the front faces of cells and cleaned surface was replastered with cement, lime, sand and *surkhi* mortar.

17. EXCAVATED SITE, HASTINAPUR, DISTRICT MEERUT.— Barbed wire fencing with angle-iron-post was provided around the mound.

18. BALESHWAR TEMPLE, CHAMPA VAT, DISTRICT PITHORAGARH.—The huge tree near the main shrine was removed after pruning the branches which were hanging over the Shrine. Stone-flooring was provided in between the main shrine and Champavati temple after laying 8 cm base concrete.

19. BADSHAHI MAHAL, BADSHAHI BAGH, DISTRICT SAHARANPUR.— Vegetation clearance was done including removal of roots, etc., from the walls and the other parts of the superstructure. Repairs were carried out using *lakhauri* bricks in cement, lime, *surkhi* and coarse-sand mortar. Watertightening was also done on the coping of the walls.

Aurangabad Circle

MAHARASHTRA

20. AJANTA CAVES, AJANTA, DISTRICT AURANGABAD.— The construction of retaining wall for extending the courtyard in front of booking office was completed by concreting and chiselling the top. Over which three rows of pipe-railing was provided. The work of providing track-lighting in Cave 17 was taken up. Wooden planks of the bridge between Cave 20 and 21 were replaced. Wooden doors of the caves were repaired. The work of widening the steps from foot of the hill upto booking office is in progress. Reconstruction of fallen retaining wall in front of Cave 8 was completed. The flight of steps near Cave 19, 21, 10 were repaired. Construction of staff quarters at Phardapur is in progress.

21. TOMB OF RABIA DAURANI (BIBI-KA-MAQBARA), AURANGABAD, DISTRICT AURANGABAD.— The area in front of Maqbara on southern side along the road leading to Circle office was fenced with barbed wire.

22. DAULATABAD FORT AND MONUMENTS, DAULATABAD, DISTRICT AURANGABAD.— In continuation of previous year's work the reconstruction of fallen wall of Rangamahal with available stones was completed. The damaged and broken rock-cut pillars and pilasters of Andheri were replaced with R.C. C. pillars and pilasters matching the original. Reconstruction of compound wall of *Aam- khas* was taken up. The work of providing lime concrete bed over a layer of rubble soling for the cells of Kalakot was also completed.

23. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD.— In continuation of previous year's work, the fallen portions of the walls and head-wall of the hume-pipe culvert across the road leading to Cave 32 were reconstructed with rubble masonry with proper better. The carriage way of the arched bridge across the road from Cave 16 to 29 was strengthened by concreting. Construction of retaining wall in front of Cave 16 was taken up and completed. The work of raising the height of the parapet wall near Cave 16 (B) was completed. Providing steps to Cave 16 by cutting rock is in progress. The fallen facade of first floor of the three storeyed Cave 12 was restored in R.C.C.

24. ANCIENT MOUND, PAITHAN, DISTRICT AURANGABAD.— The area was fenced with barbed wire.

25. UKHADESHWAR TEMPLE, UKHADPIMPRI, DISTRICT BEED.— Reconstruction of fallen northern wall of the temple was completed and fencing work is in progress (pl. LXIX).

26. FORT WALL AND GATE, PAUNI, DISTRICT BHULDHANA.— The reconstruction of the south-east corner of main gate of Pauni fort was taken up. The gate was constructed in brick masonry in lime mortar. The reconstruction of fallen walls of the gate was taken up in brick masonry.

A out-of-plumb and cracked portion of southern end of the fort wall of Pauni was dismantled and reconstruction of the same was taken up in rubble masonry as per original.

27. FORT, BHANDAK, DISTRICT CHANDRAPUR.—The fallen wall of the stepped well inside the fort was reconstructed.

28. FORT WALL AND GATES, CHANDRAPUR, DISTRICT CHANDRAPUR.—The reconstruction of fallen portion of fort wall near the Pathanpura gate was taken up. The base stones were removed and strengthened.

29. GROUP OF TEMPLES, CHARMOSHI, MARKANDA TALUK, DISTRICT GADACHIROLI.— The modern plaster over the outer Mrityunjaya temple was deplastered. The exposed portions were pointed. The entrance of all the sub-shrines were provided with wooden doors. Iron grills were provided to Dasavatara temple for the safety of the loose sculptures.

The leaking *mahamandapa* of Mrukunda Rishi temple was watertightened. The missing central roof of the *sabha mandapa* of the Markandadeva temple was properly covered with R.C.C. slab with a provision of eight skylight windows.

30. CHANGDEO TEMPLE, EDLABAD, DISTRICT JALGAON.— The sunken and fallen *prakara* wall of the Changdeo temple was removed and reconstructed with available stones after providing a proper concrete foundation.

31. PATNADEVI TEMPLE, PATAN, DISTRICT JALGAON.— The work of pointing the high retaining wall of the temple was taken up and completed.

32. SHIVNERI FORT, JUNNAR, DISTRICT PUNE.— The work of replacing the damaged wooden members of Shivai temple was completed.

33. ELEPHANTA CAVES, ELEPHANTA ISLAND, DISTRICT RAIGAD.— In order to support the facade of Cave 2, R.C.C. pillars were provided to the missing rock-cut pillars. The work of providing railing in front of Cave 1 to 4 was taken up.

Bangalore Circle

KARNATAKA

34. TIPU SULTAN PALACE, BANGALORE, DISTRICT BANGALORE.—A new bore-well was dug in the archaeological area for ensuring regular supply of water to the garden.

35. FORT, DEVANAHALLI, DISTRICT BANGALORE.— The existing ugly looking stone pavement around Tipu Sultan's birth place was removed and fresh dressed granite slabs were paved. Old decayed plaster over the inner and outer surfaces of the walls, pillars and roof was raked out and replastered using cement mortar mixed with colour oxide to match with the original. The birth place proper was provided with mild steel grill to avoid visitors and animals trampling the area.

36. TIPU SULTAN'S UPPER FORT AND CITADEL, BELLARY, DISTRICT BELLARY.— Fallen portion of the fort wall near the first entrance was reconstructed as per original. The dry stone masonry pitching provided near the entrance of the fort was recess-pointed with combination mortar.

37. EXCAVATED REMAINS IN THE MINT AREA, KAMALAPURAM, DISTRICT BELLARY.— Structure I and II exposed earlier in the mint area were brought to relief following the original plan and utilising the available moulded architectural members. The stone rubble walls set in mud mortar were raised to requisite height to bring the layout to relief. The joints of the basements and walls were recess-pointed using lime mortar mixed with red oxide to give original look. The top surface was watertightened with a coat of weather proof course. The exposed tanks and water channels were reset as per the original contour and gradient and the area was levelled by putting layers of rubble and earth.

38. JAINA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.— The stone masonry parapet provided earlier over the temple was removed. The decayed and damaged weather proof course over the roof was also removed. The work of providing fresh as well as old stone blocks in the missing portions of the western and eastern wall is in progress. The broken roof and ceiling slabs were strengthened by using steel dowels and araldite. The area around the temple was levelled and dry stone pitching was provided. One of the broken beams was mended using concealed I-Section girder and the uglylooking masonry prop was removed.

39. LOTUS MAHAL, KAMALAPURAM, DISTRICT BELLARY.— The dead and decayed concrete of the floor and lime-plaster over the walls, piers and ceilings were removed for replastering. Fresh plastering work is in progress.

40. PATTABHIRAMA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.— The broken beams of the *kalyana-mandapa* were mended using non-magnetic S.S. dowels and the masonry supports were dismantled. The unevenly sunken floor was relaid after due levelling and providing with new dressed slabs wherever required. The *gopura* over the eastern *mahadvara* which was suitably strengthened earlier, was given a colour wash to match with the original.

41. QUEEN'S BATH, KAMALAPURAM, DISTRICT BELLARY.— Providing of fresh plaster in combination mortar after the removal of dead plaster in the ceiling and wall surface is in progress. The damaged water channels were repaired and reconditioned. The wall of the tank at the entrance was given a colour wash to match with the original.

42. KRISHNA TEMPLE, KRISHNAPURAM, DISTRICT BELLARY.— The out-of-plumb and dislodged cloister *mandapa* in the north-eastern corner of the temple, was dismantled and is being reset as per the original by suitably strengthening the foundation. The core of the enclosure wall was filled with brick bats set in cement mortar and the broken beams were mended using concealed non-magnetic stainless steel dowels. The veneering stones of the wall of the kitchen which were dismantled earlier were re set as per the original after core-filling.

43. NARASIMHA STATUE, KRISHNAPURAM, DISTRICT BELLARY.— The old and newly prepared architectural and the sculptured fragments stacked in the premises of the Narasimha statue, were duly documented and shifted to the Archaeological Museum, Hampi (Kamalapuram) as per the recommendation of the expert committee. The out-of-plumb western wall of the *prakara* of the Narasimha shrine was dismantled and reconstructed as per the original.

44. GOPALAKRISHNA TEMPLE, THIMMALAPURAM, DISTRICT BELLARY.— The roof of the *navaranga* and the *mukha-mandapa* was rendered watertight by laying a fresh weather-proof course.

45. ACHYUTARAYA TEMPLE, VENKATAPURAM, DISTRICT BELLARY.— The listed cloistered *mandapa* of the western part of the northern inner enclosure was dismantled after due recording and reset as per the original using the available architectural members after strengthening the foundation.

46. CHIKKIGUDI, AIHOLE, DISTRICT BIJAPUR.— The archaeological area around the temple was fenced using 'L' - shaped angle iron posts and chain over a toe wall on the eastern and southern sides.

47. GALAGANATHA GROUP OF TEMPLES, AIHOLE, DISTRICT BIJAPUR.— The dislodged and out-of-plumb sub-shrines and adjoining *mandapas* located to the south of the Galaganatha temple were dismantled and reconstructed as per the original using the available architectural members. The area around these structures was levelled exposing thereby the complete plan of the adjoining *mandapas* which were brought to relief.

48. JAINA AND VAISHNAVA CAVES, BADAMI, DISTRICT BIJAPUR.—The height of the mud masonry walls in front of Cave I, II and III were lowered to provide better view of the monuments. The archaeological area in front of the caves were fenced again by providing chain link welded to 'L' shaped

angles over dwarf compound wall and finished to match with the colour of the natural boulders (pi. LXX). The approach steps were repaired and widened wherever necessary. The pathway leading to the caves was levelled and relaid with red *murrum* after suitable consolidation.

49. ARQUILLA, BIJAPUR, DISTRICT BIJAPUR.— The damaged and ugly looking fencing provided to the protected area on the moat side was dismantled and refencing was done using angle iron posts and chain link mesh after raising dwarf wall of requisite height. The fencing was suitably painted to match with the fort wall in the background.

50. GOLGUMBAD, BIJAPUR, DISTRICT BIJAPUR.— The damaged compound wall on the western and northern sides was carefully dismantled and reconstructed as per the original using similar materials set in cement mortar. The joints were pointed and suitably colour washed to match with the existing portions of the wall.

51. IBRAHIM RAUZA, BIJAPUR, DISTRICT BIJAPUR.— The walls and ceilings of the Rauza were chemically treated to remove the stains caused by the excreta of the bats. Missing architectural members like minaret, finial, parapet, etc., were prepared afresh following the original patterns in trap stone and fixed at requisite places. To stop the menace of birds and bats, chicken mesh set in wooden frame was provided below the dome of the mosque.

52. MEHATARI MAHAL, BIJAPUR, DISTRICT BIJAPUR.— The partly collapsed and hanging rubble masonry walls and arches on the northern side of the monument were carefully dismantled. The same were reset in lime mortar and a water proof course of brick jelly concrete was provided to the terrace and plastered with combination mortar using suitable colour to match the adjoining structures.

53. PAPANATHA TEMPLE, PATTADAKAL, DISTRICT BIJAPUR.— The archaeological area between the Virupaksha and the Papanatha temples on the river side alongwith the approach road was fenced using angle iron posts and barbed wire after raising toe wall to the requisite height.

54. VIRANARAYANA TEMPLE, BELAVADI, DISTRICT CHIKMAGALUR.— The north-western portion of the *mandapa* was reset as per the original with the available members and with fresh ones wherever the originals missing (pl. LXXI).

55. VIDYASANKARA TEMPLE, SRINGERI, DISTRICT CHIKMAGALUR.— Grouting and pointing of the joints of *sikhara* was completed. The flat roof of the attic-chambers were levelled by laying fresh weather-proof brick jelly concrete. G.I. pipe water spouts of suitable size were introduced at regular intervals. The joints of the flat roof over the *navaranga* were pointed with epoxy resin and M-seal. The entire archaeological area to the east and south of the temple was levelled and new granite paving slabs were provided besides relaying the undulated flooring in certain portions. The joints were pointed suitably (pl. LXXII).

56. GAREBAGILU FORT, CHITRADURGA, DISTRICT CHITRADURGA.— The floor was provided with fresh stone pavement. The roof over the gateway was watertightened by providing a fresh layer of brick jelly concrete and finished as per the original.

57. FORT AND TEMPLES, CHITRADURGA, DISTRICT CHITRADURGA.—The damaged and fallen southern portion of the fort wall near the bastion and gate 4 was reconstructed as per the original using the available and fresh cut stones set in combination mortar and the joints were pointed.

58. SAMPIGE SIDDESWARA TEMPLE, FORT, CHITRADURGA, DISTRICT CHITRADURGA.— The platform in front of the courtyard was reset as per the original and the sunken flooring of the courtyard was dismantled and relaid. The out-of-plumb *mandapa* was also dismantled and reconstructed as per the original.

59. FORT AND LARGE MASONRY ELEPHANTS, MERCARA, DISTRICT COORG.— The archaeological area on the eastern side of the fort was fenced using barbed wire and a grill gate was fixed, stone-pitching was provided along the fenced slopes.

60. JAINA TEMPLES, MULLUR, DISTRICT COORG.— Fresh dressed stone apron, 2 m wide, along with kerb-stones were provided around the three stone-built temples to prevent stagnation and percolation of rain water into the foundation. The slab joints were pointed with cement mortar. The stone images of the temples which had been removed during conservation work were duly reinstated in their respective original positions. Fresh flooring was laid inside the shrines.

61. KESAVA TEMPLE, BELUR, DISTRICT HASSAN.—The deteriorated stucco sculptures and decorative motifs on the western face of the *gopura* on the *mahadvara* were mended following the original after removing the encrustations.

62. KEDARESVARA TEMPLE, HALEBID, DISTRICT HASSAN.— The damaged enclosure wall on all the sides was dismantled. A toe wall was constructed after providing a foundation and fencing was done using chain link mesh welded to 'L' angle posts. Part of the remaining enclosure wall and the entrance were also set to the plumb (pl. LXXIII).

63. ANCIENT PALACE SITE AND REMAINS, SRIRANGAPATNA, DISTRICT MANDYA.— The debris accumulated over the palace remains were scientifically removed to expose the hidden plan which is being suitably conserved.

64. TIPU SULTAN'S TOMB, SRIRANGAPATNA, DISTRICT MANDYA.— Fresh water proof colour wash was provided to the dome, minarets, parapet, etc. of the tomb and the adjoining mosque. The damaged lime concrete flooring of the *khankhana* was removed and fresh concrete bed was laid and plastered as per the original. New G.I. pipe line connection was provided to the toilet block within the complex to ensure continuous water supply.

65. JAMI MASJID, SRIRANGAPATNA, DISTRICT MANDYA.—The damaged stucco work and designs on the dome over the *mihrab,* minaret on the northern side and parapet wall were mended as per the original after duly strengthening. The surface was thoroughly cleaned of bird excreta and fresh colour wash was given matching with the original.

66. RANGANATHASVAMI TEMPLE, SRIRANGAPATNA, DISTRICT MANDYA.— The decayed and damaged plaster over the merlons on the *prakara* wall was removed and replastered. The *gopura* over the eastern *mahadvara* was washed with suitable colour to match with the original.

67. NAMBINARAYANA TEMPLE, TONNUR, DISTRICT MANDYA.— The open courtyard on the western side near the *prakara* wall was provided with stone flooring after due levelling.

68. SRIKANTHESVARA TEMPLE, NANJANGUD, DISTRICT MYSORE.— The deteriorated and damaged decorative motifs and figures of stucco of the *hara* portion of the northern, southern and western sides

of the open courtyard around the *kalyanamandapa* were mended following the original after strengthening them by grouting wherever necessary.

69. SOMESVARA TEMPLE, BELLIGAVI, DISTRICT SHIMOGA.— The sunken and out-of-plumb walls of the *garbhagriha* were carefully dismantled and are being reset as per the original after strengthening the foundation.

70. RAMESVARA TEMPLE, KUPPAGADDE, DISTRICT SHIMOGA.—The sunken and out-of-plumb northern portion of *sabha-mandapa* was dismantled and reset as per the original after duly strengthening the foundation.

71. GROUP OF MONUMENTS, UDRI, DISTRICT SHIMOGA.— The fallen and out-of-plumb outer veneering members of the eastern, northern and southern sides of the Jaina temple are being reset as per the original using the available architectural members.

72. CHENNIGARAYA TEMPLE, ARALAGUPPE, DISTRICT TUMKUR.— Dressed schist stone slabs were paved around the *jagati* specially designed door was provided at the entrance.

73. JATTAPPANAIK CHANDRANATHESVARA BASTI, BHATKAL, DISTRICT UTTARA KANNADA.— The sunken and out-of-plumb *mandapa* of *dhvajastambha* was dismantled for reconstruction after suitably strengthening the foundation. The dead and decayed concrete over the roof of the *sabha-mandapa* was removed for providing fresh weather-proof course. The decayed concrete beams are being replaced by new stone beams.

74. JOSHISHANKARA TEMPLE, BHATKAL, DISTRICT UTTAR KANNADA.— The missing perforated windows, lintels, etc., were provided afresh wherever necessary. The dislodged members of the walls around the temple were dismantled and reconstructed as per the original. The *floor* of the *pradakshinapatha* and the *mandapa* were relaid by providing fresh stone slabs wherever necessary. The roof was watertightened. Laterite stone pavement was provided around the temple.

75. LAKKAR KAMTI NARAYANA TEMPLE, BHATKAL, DISTRICT UTTARA KANNADA.— The broken beams and slabs of the sanctum and the *mukha mandapa* were mended suitably using stainless steel dowels and araldite. Dressed schist stone roof and hood stone slabs were provided afresh wherever necessary and watertightened. Low laterite wall was constructed for basement to serve as a barricade for avoiding stagnation and seepage of water into the basement. Laterite flooring was done in the space between the *mukha mandapa* and the open pillared *mandapa.*

Bhopal Circle

MADHYA PRADESH

76. WESTERN GROUP OF TEMPLES, KHAJURAHO, DISTRICT CHHATARPUR.— In continuation of the last year's work *(1990-91,* pp. 123-24), replacement of the old and worn-out G.I. barbed wire fencing on angle iron post of the eastern side enclosure of western group of temples with C.R. stone masonry dwarf wall mounted with M.S. grill railing remained in progress. Approach road leading to Jagadambi temple was treated with concrete.

77. BUDDHIST ROCK-CUT CAVES, BAGH, DISTRICT DHAR.— In continuation of the last year's work *(1990-91*, p. 124), the rock finishing work of Cave 6 remained in progress. Debris of fallen ceiling chunk from Cave 7 were removed. The work remained in progress.

78. GADA SHAH PALACE, MANDU, DISTRICT DHAR.— Excavation and removal of debris of fallen structures and exposition of ancient water channels and tanks were in progress. Repairs to approach steps and retaining wall also remained in progress.

79. DHARAMSHALA, HOSHANGSHAH'S TOMB, MANDU, DISTRICT DHAR.— In continuation of the last year's work *(1990-91,* p. 124), replacement of decayed and damaged lime stone flooring of Dharamshala of Hoshangshah tomb with fine chisel dressed lime stone slabs quarried departmentally from Zeerabad quarry remained in progress.

80. JAMA MASJID, MANDU, DISTRICT DHAR.—In continuation of last year's work *(1990-91*, p. 124), restoration of damaged and missing stone *chhajas* with fresh fine chisel-dressed limestone *chhajas* remained in progress. Opening of the damaged and bulged out stone masonry of arch after providing proper temporary masonry support to domed portion of the arch remained in progress to restore the arch in plumb and alignment (pl. LXXIV).

81. TAVELI MAHAL, MANDU, DISTRICT DHAR.— In continuation of last year's work *(1990-91,* p. 124) of closing of arch openings of basement and ground floor with angle iron door shutters with welded wire mesh remained in progress for preparation of gallery at ground floor for display of local antiquities of Mandu region.

82. WATER PALACE, SADALPUR, DISTRICT DHAR.— In continuation of the last year's work *(1990-91, p.* 125), the river silt deposited near water palace was excavated and removed to avoid flooding of the palace area. Restoration of damaged and missing underground water channels with fresh earthen pipes overlaid with lime concrete flooring was also completed.

83. KOSHAK MAHAL, CHANDERI, DISTRICT GUNA.— The work of construction of compound wall for enclosing the area at the back of the Koshak Mahal with a view to reclaiming the land around the monument for environmental development remained in progress.

84. GROUP OF TEMPLES, KADWAHA, DISTRICT GUNA.— The work of construction of stone masonry compound wall around Talab group of temples for security as well as to check the encroachment remained in progress.

85. TOMB OF ABUL FAZL, ANTRI, DISTRICT GWALIOR— In continuation of the last year's work *(1990-91,* p. 125), replacement of worn out and damaged G.I. barbed wire fencing with stone masonry dwarf wall with angle iron posts was completed. Levelling the area by filling the black cotton soil for laying garden for environmental development of the monument was also completed.

86. BALDEO KUNDI, BARA, DISTRICT GWALIOR.— Land was acquired for providing approach path to the recently-protected rock shelters.

87. ROCK-CUT JAIN COLLOSI (EK PATHAR KI BAOLI), GWALIOR, DISTRICT GWALIOR.— In continuation of the last year's work *(1990-91,* p. 125) the approach steps leading to Cave 26 were provided with R.C.C. slab with rock finish to protect the cave from accumulation of rain water and bird dropping.

88. JAIN COLLOSI, URWAI GATE, GWALIOR, DISTRICT GWALIOR.— In continuation of the last year's work *(1990-91,* p. 125) G.I. pipe railing was provided to the flight of steps leading to Jain collosi on north and south; pitching and dwarf wall was provided on the slope to check soil erosion.

89. MANSINGH PALACE, GWALIOR FORT, DISTRICT GWALIOR.— In continuation of last year' s work *(1990-91,* p. 125), the construction of reinforced course rubble stone masonry to provide support to the foundation of Bastion 3 was completed. Rock finishing of reinforced C.R. stone masonry with lime cement plaster remained in progress. The damage and broken stone beams of make up room were strengthened by providing R.C.C. beams over broken stone beams and clamping the stone ceiling in position and watertightening the roof terrace by providing and laying fresh lime concrete. The work is in progress.

90. TOMB OF MOHAMMAD GHAUS AND TANSEN, GWALIOR, DISTRICT GWALIOR.— In continuation of the last year's work *(1990-91,* p. 125), the old worn-out and damaged G.I. barbed wire fencing on entrance side was removed and shifted away from the monument and was replaced with C.R. stone masonry dwarf wall mounted with M.S. grill railing. This was done in order to reclaim more land for laying garden for environmental development and to check the trespassing remained in progress. The M.P.E.B. Gwalior was entrusted with the work of replacement of overhead electric wires with underground cables to improve the look of the monument.

91. TEMPLE REMAINS, BADGAON, DISTRICT JABALPUR.— In continuation of the last year's work *(1990-91,* p. 125), the excavation of buried structures remained in progress. Enclosing of the area with G.I. barbed wire fencing on angle iron posts also remained in progress for security of antiquities as well as to check encroachment.

92. OLD FORT, BURHANPUR, DISTRICT KHANDWA.— Removal of marble flooring and excavation of the debris to expose the ancient tanks of the royal *hammam* remained in progress. Excavation of dumped *malba* from the underground cells, removal of the same to the river bank, underpinning with bricks of ancient size and restoration of arches to strengthen the structure also remained in progress.

93. CHAUBARA DERA, UN, DISTRICT KHARGONE.— The work of removal of stones from the fallen portion of sub-shrine of Chaubara Dera 1 and stacking useful stones which could be later utilized for restoration of the sub-shrine was completed.

94. KAKANMATH TEMPLE, SUHANIA, DISTRICT MORERNA.— In continuation of the last year's work *(1990-91,* p. 126), dismantling of damaged and bulged out lower *jagati* on north and west side and restoration of the same in plumb and alignment with available fine chisel-dressed ashlar stones laid over cement concrete base conjugated with R.R. stone masonry retaining wall in the rear side of *the jagati* to retain the earth pressure of *jagati* platform remained in progress (pl. LXXV). The M.P.E.B. Morena was entrusted with the work of security and proper illumination of the temple.

95. AJAIGARH FORT, AJAIGARH, DISTRICT PANNA.— In continuation of the last year's work *(1990-. 91, p. 1*26), the repair to the cracked door lintel of Gate 5 was repaired and restored for storage of stone sculptures. The work was completed.

96. CHAUMUKH NATH AND PARVATI TEMPLES, NACHNA, DISTRICT PANNA.— The old, damaged and worn-out low G.I. barbed wire fencing on stone posts was replaced with high G.I. barbed wire fencing

on angle iron posts in the Parvati and Chaumukhnatha temples. The approach *paths* leading to both the temples were provided with flag-stone flooring. The door openings of the Chaumukhnatha temple was repaired and re-laid. The work was completed.

97. ROCK-SHELTERS, BHIMBETKA, DISTRICT RAISEN.—In continuation of the last year's work *(1990-91,* p. 126) the reconditioning of the approach path leading to rock-shelters was provided with stone edging. Paving with cement concrete with flat boulder was in progress.

98. SIVA TEMPLE, BHOJPUR, DISTRICT RAISEN.— In continuation of the last year's work *(1990-91,* p. 126), the damaged and missing steps of temple platform and sanctum were repaired and restored. Additional stones placed on either sides of approach steps of the sanctum were removed to bring the original look. Temporary wooden steps were provided on the outer side of the sanctum to facilitate the visitors during the Makara Sankranti and Sivaratri festivals. Restoration of damaged and missing facade of north-west corner with fine chisel dressed ashlar stone masonry and filling of the back with R.R. block stone masonry is in progress.

99. GROUP OF BUDDHIST MONUMENTS, SANCHI, DISTRICT RAISEN.— In continuation of the last year's work *(1990-90,* p. 126), the restoration of votive stupa and exposition of new votive stupa and conservation by restoring few layers and watertightening the top remained in progress. The paving of lower and upper periphery of Stupa 2 with chisel dressed stone flooring is in progress.

100. RAJA RANI MAHAL, FORT, DHAMONI, DISTRICT SAGAR.— In continuation of the last year's work *(1990-91,p.* 126), restoration of damaged and missing walls with R.R. stone masonry and watertightening the same was completed. Debris from the cells and chambers were removed. The old, decayed and damaged flooring of cells and chambers were replaced with fresh lime concrete flooring. The work is in progress.

101. BADAL MAHAL, ROHATGARH PORT, ROHATGARH, DISTRICT SAGAR.— In continuation of the last year's work *(1990-91,* p. 126) restoration of damaged and missing arch roof of Badal Mahal with R.R. masonry is in progress.

102. HELIODOROUS PILLAR, BESNAGAR, DISTRICT VIDISHA.— The work of the dismantling the old damaged and bulged out R.R. stone masonry compound and G.I. barbed wire fencing and restoration is in progress.

103. ATHKHAMBA, GYARASPUR, DISTRICT VIDISHA.— The work of replacement of old damaged and worn-out low G.I. barbed wire fencing on stone posts with stone masonry dwarf wall mounted with M.S. grill railing for security and to check the encroachment was taken up and is in progress.

104. MALADEVI TEMPLE, GYARASPUR, DISTRICT VIDISHA.— In continuation of the last year's work *(1990-91,* p. 126), the realignment of the flight of steps leading to the temple was completed. Stone pitching of the approach *path* leading to flight of steps on concrete base to check the soil erosion and easy movement of visitors was also completed. Providing and fixing G.I. pipe railing on either sides of the flight of the approach steps to avoid any mishap and easy climbing of the visitors is in progress.

105. BIJAMANDAL, VIDISHA, DISTRICT VIDISHA.— The bulged and damaged wall of the *jagati* of the temple was fully exposed alongwith number of stone sculptures and architectural members. In order

to house the loose sculptures, the opening of the pillared pavilion was provided with collapsible door shutter.

Bhubaneswar Circle

MADHYA PRADESH

106. CHANDRADITYA TEMPLE, BARSOOR, DISTRICT BASTAR.—The work of providing veneering stone of the outer wall was taken up by collecting and dressing the stones and by filling up of the core.

107. PATELESWAR TEMPLE, MALHAR, DISTRICT BILASPUR.—The area around the temple was enclosed by constructing a compound wall in C.R. masonry.

108. KANTI DEUL, RATANPUR, DISTRICT BILASPUR.— The construction of retaining wall on the southern side towards pond and platform was completed.

109. SIVA TEMPLE, DEOBOLODA, DISTRICT DURG.— Foundation for construction of compound wall was dug up. The damaged barbed wire fencing was dismantled.

110. LAXMAN TEMPLE, SIRPUR, DISTRICT RAIPUR.— The area around the temple was improved by constructing dwarf wall to check land erosion. The bulged out laterite stone wall of the basement was reset.

ORISSA

111. CHAUSATH YOGINI TEMPLE, RANIPUR-JHARIAL, DISTRICT BALANGIR.—To strengthen the foundation and to eradicate dislodgement and collapse of the structure standing just on barrier granite bed, one and half metre wide apron was provided around the circular temple.

112. EXCAVATED BUDDHIST SITE, LALITAGIRI, DISTRICT CUTTACK.— The cells, varandah, courtyard, drains, etc., of the Monastery 1 were restored and conserved. The undulated courtyard of the Monastery 3 was also dismantled and reset as per the original.

113. EXCAVATED BUDDHIST SITE, UDAYAGIRI, DISTRICT CUTTACK.— To avoid pilferage and damage to the objects, a sculpture shed was constructed at the site.

114. BHUBANESWAR MAHADEVA TEMPLE, BAJRAKOTE, DISTRICT DHENKANAL.— To improve the surroundings and to remove the existing temporary kitchen, two sets of kitchen blocks were constructed including a store shed at the north-west corner.

115. ASOKAN ROCK EDICT, JAUGADH, DISTRICT GANJAM.— Half of the area was cordoned off by R.C.C. post for barbed wire fencing. The existing grills were repaired and colour applied. The roof and pillars of the *mandapa* was white washed and the roof watertightened.

116. PASCHIMA SOMANATH TEMPLE, BOUDH, DISTRICT PHULBANI.— The work of replacement of missing and worn-out architectural members of *sikhara* with new carved red stone block with combination mortar was completed. The star-shaped missing basement was constructed with the help of newly dressed stone blocks as per original Kapileswar temple.

117. NILAMADHAVA AND SIDDHESWARA TEMPLES, GANDHARADI, DISTRICT PHULBANI.— The work of resetting and renewing the missing and damaged architectural members of the *mukha-mandapa* of Siddheswara and Nilamadhava temples were completed (pl. LXXVI).

118. DAKSHYA PRAJAPATI TEMPLE, BANPUR, DISTRICT PURL— The roof of Hanuman *mandir* was watertightened. The damaged wooden door of the kitchen was replaced with new ones. Watertightening the roof of *jagamohana* with epoxy mortar and laterite pavement work on the extreme eastern side of the complex is in progress.

119. JAMBESWAR TEMPLE, BHUBANESWAR, DISTRICT PURL— Uneven flooring of the courtyard on the southern side was dismantled and relaid. Missing portion of the sub-shrine was restored.

120. LORD LINGARAJA TEMPLE COMPLEX, BHUBANESWAR, DISTRICT PURL— The broken and bulged-out architectural members of Baidyanatha, Yami temple, etc., on the western side of the Lingaraja temple complex were dismantled and restored as per original.

121. RAJARANI TEMPLE, BHUBANESWAR, DISTRICT PURL—The damaged barbed wire fencing towards front side (north) of Rajarani temple complex was removed. Dwarf compound wall on northern side was constructed and the earlier barbed wire fencing was raised.

122. KHANDAGIRI AND UDAYAGIRI CAVES , BHUBANESWAR, DISTRICT PURL— Hathi Gumpha cave was paved with sandstone flooring. Nine R.C.C. pillars were also constructed at Ranigumpha cave to support the overhanging roof and missing roof beam and ceiling was also restored.

123. VARAHI TEMPLE, CHAURASI, DISTRICT PURL— The damaged wall on the southern side of the *mukhamandapa* due to salt action was removed and replaced with new carved stone blocks.

124. LORD JAGANNATH TEMPLE COMPLEX, PURI, DISTRICT PURL— The missing battlements on southern side of *Kurmi beda* was restored and brick battlement plastered with cement.

Construction of corbelling wall below *amalaka* on western side of Jagannath temple was completed with dressed Khondalite stone and the top waterightened. As per the recommendation of the IXth Expert Committee seven pillars were erected. The work of underpinning the eastern corner of *vimana* was completed and fresh deplastering on northern and western sides was resumed.

The inner portion of the *garbhagriha* at first floor was also attended to by removing dead lime concrete and by reconcreting in cement. The disintegreated stones were replaced. Tilted corner stones at the top of the existing corbelling roof was also restored and the joints were filled up with epoxy putty.

In order to remove the encroachments the area on the west, north and southern sides were fenced.

The damaged *beki* and *amala* of the Vimala temple was dismantled and restored. Construction of Khapuri with Khondalite stone was completed. Epoxy pointing, sealing of joints and cracks were also attended to. The conservation of the *vimana* was also completed.

The work of deplastering the three sub-shrines dedicated to Khirachora Gopinath, Saraswati, Nilamadhava were taken up and completed. The conservation work of Gopinath is in progress.

Calcutta Circle

SIKKIM

125. CORONATION THRONE OF NORBUGANG, WEST DISTRICT.— After careful removal of vegetation from the surface, the cracks and voids of the main structure were filled up by grouting and underpinning. Stone masonry work was carried out to strengthen the stability of poor structural contents particularly the wall portions and the floor area.

WEST BENGAL

126. LALJI TEMPLE, BISHNUPUR, DISTRICT BANKURA.— The damaged portions of both the laterite temple and its brick compound wall were restored (pl. LXXVII).

127. COOCH BEHAR PALACE, COOCH BEHAR, DISTRICT COOCH BEHAR.— The damaged wall of the verandah of the first floor on the eastern side was repaired by underpinning, plastering and white washing.

128. BRINDABAN CHANDRA JEWS MATH, GUPTIPARA, DISTRICT HOOGHLY.—The growth of vegetations from the surface was removed. The damaged brick compound wall on the northern side was reconstructed.

129. BAISGAZI WALL, GAUR, DISTRICT MALDA.— After careful removal of the huge cryptogamic growths, the voids in the wall were filled up by Gaur-bricks and treated finally by a thick coat of lime-*surkhi* mortar and, the top wall was watertightened.

130. ADINA MOSQUE, ADINA, DISTRICT MALDA.— The old and decayed bricks from the eastern side were removed and restored matching the original. The stone blocks available at the site were utilised for stone casing. The stone masonry work was completed by pointing and relaying the affected portions of the floor.

131. LOTTON MOSQUE, GAUR, DISTRICT MALDA.— The exterior walls above the base were repaired by underpinning and the interior arches were restored. The door-openings were provided each with metal sheet gateway.

132. QADAM RASUL MOSQUE, GAUR, DISTRICT MALDA.—The work of underpinning and brick-work on both the inner and outer side walls were taken up and completed. The missing ornamental bricks of the outer wall were restored as per the original. The dead plaster was removed and replastered. Stone plinth around the mosque was pointed. The wooden gate and metal sheet grill gate at the entrance was repaired.

133. RESIDENCY CEMETERY, BABULBONA, DISTRICT, MURSHIDABAD.— The work of underpinning and plastering, was taken up and completed.

134. IMAMBARA, MURSHIDABAD, DISTRICT MURSHIDABAD.— The worn-out and damaged *burghas* were replaced. The old and decayed mortar of the roof was removed and relaid with fresh lime concrete. The plasters of the walls were also removed and replastered and the doors and windows repainted.

Chandigarh Circle

HARYANA

135. KOS MINAR (PALWAL SIDE), DISTRICT FARIDABAD.— The Kos Minar on Palwal side was fenced with M.S. grill over rubble wall.

136. ANCIENT MOUND, AGROHA, DISTRICT HISSAR.—The work of resetting the brick courses of the stupa was taken up. The open joints were pointed.

137. FIROZ SHAH'S PALACE AND TAHKHANAS, HISSAR, DISTRICT HISSAR.— Dead and decayed plaster of entrance gate was removed and replastered as per the original. Dead and damaged concrete of the roof terrace of the palace gate was removed and the work of relaying of fresh concrete is in progress.

138. GUJRI MAHAL, HISSAR, DISTRICT HISSAR.— The undulated and sunken flooring was removed and reset. The joints were pointed.

139. MUGHAL SARAI, GHARAUNDA, DISTRICT KARNAL.— Damaged and missing portion of the structure was reproduced with *lakhauri* bricks as per original. The inner surface of the northern gate were pointed.

140. PATHAR MASJID, THANESAR, DISTRICT KURUKSHETRA.—The work of dismantling the undulated and sunken apron was taken up and is in progress. The work of restoration of missing brick masonry and sandstone flooring of the mosque including pointing the joints was also taken up and is in progress.

141. SHEIKH CHILLI'S TOMB, THANESAR, DISTRICT KURUKSHETRA.— Fallen-out and missing *lakhauri* brick work of eastern boundary wall was restored. Missing masonry pillars of gateway and arches of *madarasa* were restored as per original. A drain was provided for proper discharge of rainwater from Harsh-ka-Tila. The missing and worn-out brick masonry at plinth level of fortification wall was underpinned, grouted and joints were pointed. The modern plaster of the cells of the *madarasa* was raked out and the disturbed and damaged brick masonry work of the walls were restored and joints were pointed.

142. SHAH JAHAN KI-BAOLI, MEHAM, DISTRICT ROHTAK.— Buried structures along the outer walls on north side of *baoli* were exposed. Lime cement concrete was laid in front of platform of the *baoli.*

143. KHWAZA KHIZR TOMB, SONEPAT DISTRICT SONEPAT.— The work of watertightening and restoration of disturbed and missing masonry were completed and the joints pointed.

PUNJAB

144. GATEWAY OF THE OLD SARAI or- AKBAR OR JAHANGIR ON OLD DELHI AND LAHORE ROAD, AMANAT KHAN, DISTRICT AMRITSAR.— The terrace of the western gate was watertightened with fresh lime concrete after dismantling the dead one.

145. RAM BAGH GATE, AMRITSAR, DISTRICT AMRISTAR.— The work of resetting the dismantled red sandstone pillars, base pillars, beams and veneer slabs of *deodhi* was taken up and is in progress

146. BHATINDA FORT, BHATINDA, DISTRICT BHATINDA.— Fallen patches of brick masonry were restored in *lakhauri* bricks with lime *surkhi* mortar.

147. SARAI INCLUDING GATEWAY, DAKHNI, DISTRICT JALANDHAR.— Dead and damaged floor was renewed with fresh lime concrete and country brick.

148. KOS MINAR, JAHANGIR, DISTRICT JALANDHAR.— The work of underpinning and restoration of the disturbed and damaged *lakhauri* brick was taken up and completed by removing the decayed and pulverized plaster. The platform was watertightened and joints pointed.

149. NOORMAHAL SARAI, NOOR MAHAL, DISTRICT JALANDHAR.— The work of underpinning, recess-pointing the joints and restoration of *lakhauri* tile-brick masonry of western gate, inner side varandah and cells was taken up and is in progress.

Delhi Circle

DELHI

150. JAMI-MASJID, DELHI.— Old and decayed red sandstone flooring was removed from the courtyard and simultaneously 100 mm thick red sandstone flooring laid in consonance with the original pattern.

151. RED FORT, DELHI.—Broken and damaged *chhajja* stones of *chhatris* of Delhi Gate were taken out carefully and fresh *chhaja* stones provided in accordance with the original pattern. In addition to it, joints were pointed to render the top watertight.

152. BARA-KHAMBA, HAUZ KHAS, NEW DELHI.— Extensive structural repairs which involve underpinning of rubble stone masonry and pointing the joints with composite mortar was carried out in accordance with the original pattern.Wide and deep cracks developed on either sides of the dome were stitched and grouted. A coat of plaster was also applied to render the top watertight (pl. LXXVIII).

153. QUTB MINAR, NEW DELHI.— Structural repairs to the first storey of Qutb Minar were carried out in consonance with the original pattern after scopping out the decayed and crushed veneer stones and removing the corroded iron dowels and refixing new red sandstone veneers (pl. LXXIX).

154. KOTLA FEROZ SHAH, NEW DELHI.— Missing pan of the eastern side enclosure wall was restored and the joints pointed as per the original (pl. LXXX).

155. KOTLA FEROZ SHAH, NEW DELHI.— Bulged and overhanging stone masonry endangering the safety of the monument was dismantled and simultaneously repaired strictly in accordance with the original pattern by way of rubble stone masonry and pointing the joints with composite mortar.

156. PURANA QILA, NEW DELHI.— Bulged and overhanging stone masonry of the bastion on the south-western side was dismantled and simultaneously preserved by way of rubble masonry with composite mortar in conformity with the original pattern.

157. CHAUSATH KHAMBA, NIZAMUDDIN, NEW DELHI.— Extensive structural repairs which involve underpinning of rubble stone masonry, stitching of wide and deep cracks in ceiling, pointing the joints of stone masonry and laying lime cement concrete on the terrace were carried out as per the original.

158. SUNDERWALA-MAHAL, NIZAMUDDIN, NEW DELHI.— Structural repairs which consist random rubble masonry, pointing, laying lime cement concrete flooring and stitching of wide and deep cracks were carried out in consonance with the original pattern.

159. TUGHLAGABAD FORT, NEW DELHI.— Loose and overhanging rubble stone masonry was dismantled and structural repairs by way of underpinning of rubble stone masonry and pointing with composite mortar was carried out following the original pattern.

160. LAL GUMBAD, MALAVIYA NAGAR, NEW DELHI.— Underpinning the rubble stone masonry, pointing and plastering with composite mortar were carried out in accordance with the original pattern.

161. LAL BANGLA, NEW DELHI.— Old and decayed lime concrete flooring was removed and relaid with lime cement concrete.

162. AFSARWALA TOMB, HUMAYUN'S TOMB, NEW DELHI.— Extensive structural repairs which involve underpinning of rubble stone masonry, plastering and pointing with composite mortar were carried out strictly in accordance with the original pattern.

Guwahati Circle

ARUNACHAL

PRADESH

163. TAWANG MONASTERY, DISTRICT TAWANG.—Decayed wooden beams and planks of the western side floor of the store building of the monastery were replaced. The partition wall provided earlier was also taken out. The cracks and bulges developed on the walls were also reset. The windows and ventilators of the Library were also replaced. The retaining wall near the kitchen was also repaired.

ASSAM

164. SIBDOL, NEGHERITHING, DISTRICT GOLAGHAT.— The decayed plaster from the exterior were raked out and replastered after filling the cracks. The sub-shrines were lime concreted.

165. AHOM RAJA'S PALACE, GARHGAON, DISTRICT SIBSAGAR.—The cornices and ornamental plasters were repaired and joints pointed.

166. DEVIDOL, GAURISAGAR, DISTRICT SIBSAGAR.— The decayed and pulverized lime concrete roof of the *mukhamandapa* was removed and re-concreted. The plinth of the temple was also provided with brick plinth protection. The undulated portions of the compound were dressed and levelled.

167. BISHNUDOL, JOYSAGAR, DISTRICT SIBSAGAR.—Repairs to the *Bhogghar* were attended to by re-concreting the decayed lime concrete of the floor, replacing and providing the damaged and missing bricks and resetting the special sized bricks of the roof.

168. KARENGGHAR, JOYSAGAR, DISTRICT SIBSAGAR.— Missing portions of the brick floor of the platform on north-south were repaired with special sized bricks. The open floor was lime concreted.

169. SIBDOL, SIBSAGAR, DISTRICT SIBSAGAR.— In continuation of previous year's work, the damaged portions of the compound wall on north were reconstructed as per the original.

MANIPUR

170. TEMPLE OF VISHNU, BISHNUPUR, DISTRICT BISHNUPUR.—The temple compound was cleared off the vegetation growth, etc.

MEGHALAYA

171. STONE MEMORIAL OF U-MAWTHAW- DUR BRIEW, DISTRICT KHASI AND JAYANTIA HILLS .—Approach road was improved by providing side drains. The vegetation growths were removed from the memorial.

NAGALAND

172. FORT REMAINS, DIMAPUR, DISTRICT KOHIMA.— Barbed wire fencing was repaired and growth of moss and lichen, etc. were removed from stone monoliths and compound.

TRIPURA

173. TEMPLE OF CHATURDASA DEVATA, RADHA KISHOREPUR, DISTRICT SOUTH TRIPURA.— Missing portions of brick masonry of the temple were repaired. The floor was lime concreted and joints pointed.

Hyderabad

Circle ANDHRA

PRADESH

174. SRI SIDDHESVARA TEMPLE, HEMAVATI, DISTRICT ANANTAPUR.— The damaged and peeling out plaster was removed and fresh plaster was applied matching with original. New wooden doors were also provided.

175. SRI VEERABHADRA TEMPLE COMPLEX, LEPAKSHI, DISTRICT ANANTAPUR.— Old decayed plaster was removed and replastered. The cracks were grouted and platform around Nagalingeswara reset.

176. JAMMA MASJID INSIDE GANDIKOTA FORT, DISTRICT CUDDAPAH.— The missing edge stones of the platform all around were replaced with new ones over a neat sand cushion. The damaged flooring of the corridors and passage at the entrance was plastered.

177. SRI KANDARAMASWAMY TEMPLE, VONTIMITTA, DISTRICT CUDDAPAH.— The damaged miniature *sikhara* running over the *prakara* wall were repaired by way of underpinning and plastering, matching with the original.

178. RECONSTRUCTED STRUCTURES ON HILL-TOP, NAGARJUNAKONDA, DISTRICT GUNTUR.— The reconstructed brick structures on the hill-top were strengthened by underpinning and pointing wherever necessary as per original.

179. GOLKONDA FORT, GOLKONDA, DISTRICT HYDERABAD.— In the Balahissar area, the ramparts, main entrance, etc., were strengthened by laying concrete over the ramparts to stop ingress of rain water, the masonry joints were repointed, the roof of the main entrance watertightened. Certain areas were replastered and the entrance gateway colour washed.

The damaged plaster of the front facade walls of Allah Khana was removed and replastered maintaining the arched designs. At the ground floor only pointing was done whereas in the first and second floors replastering is being done. The work is in progress. In Rani Mahal complex, the disturbed and undulated flooring was removed and relaid properly and masonry joints cleaned.

180. TRANSPLANTED KUDAVALLI SANGAMESVARA TEMPLE, ALAMPUR, DISTRICT MAHBOOBNAGAR.— The entire acquired area around was fenced with angle iron posts and chain link mesh. The area was also levelled to drain out rain water.

181. CHOLA TEMPLE, MOTUPALLE, DISTRICT PRAKASAM.— Structural repairs like repairing and fixing of the broken beams and roof slabs of the *mukhamandapa* were attended to and also new stone flooring was laid.

182. PITTIKESVARA GROUP OF TEMPLES, PITTIKAYAGULLA, DISTRICT PRAKASAM.— The brick masonry of the main shrine was strengthened by underpinning. Cavities and loose pockets were filled and pointed. Repairs to the apsidal shrine is in progress.

183. EXCAVATED STUPA SITE, KALINGAPATNAM, DISTRICT SRIKAKULAM.— Around the excavated stupa site was fenced with barbed wire.

184. BUDDHIST STRUCTURES, SALIHUNDAM, DISTRICT SRIKAKULAM.— The badly damaged structures on the upper terrace on the hillock, Maha Stupa, Stupa chaitya, spoked chaitya and monastic cells were strengthened by way of removing the pulverized bricks and underpinning the same with available ancient bricks, pointing the joineries and watertightening the top courses, adding suitable colours to match with the original.

185. BOJJANNAKONDA ROCK-CUT CAVES, SANKARAM, DISTRICT VISAKHAPATNAM.— The weathered rock surface of the caves were arrested by way of cleaning all the crevices and grouting the cracks. The rock-cut pillars, which were heavily damaged and repaired earlier by PWD by providing R.R. masonry pillar and the stupa inside the chaitya cave were reconstructed to its original shape by using cement and steel wherever necessary and given stone effect using suitable colour and stone powder. The brick stupa on the eastern side of the cave was also cleared and strengthened.

186. THOUSAND PILLARED TEMPLE, HANAMAKONDA, DISTRICT WARANGAL.— The leaky roof of Trikuteswara temple was watertightened and part of the missing *prakara* wall on the eastern side reconstructed in cut-stone masonry using the same size stones in conformity with the original.

187. SRI KATESWARALAYAM (DEVI SHRINE), PALAMPET, DISTRICT WARANGAL.— The disturbed and dismantled *mukhamandana* of temple was re-erected to the plumb over a new raft fountain. Stainless steel dowels were used in joining the stone masonry.

188. FORT, WARANGAL, DISTRICT WARANGAL.— The loose sculptures and scattered architectural members and other ornamental pieces of the Swayambhu temple complex were arranged like an open air-museum to prevent damage and to facilitate free access to the visitors.

Earth work at a mound known as Deepa Gadda was also carried out and exposed the buried structure. A good number of antiquities were also found.

KARNATAKA

189. RANGIN MAHAL INSIDE BIDAR FORT, DISTRICT BIDAR.— The leaky roof of Rangin Mahal was attended to by removing the top plaster and laying with double layer of burnt clay tiles. The lime wash coating from the carved wooden ceiling was removed to expose the paintings underneath. The damaged teak wood planks of the ceiling and corner posts were removed and replaced with new ones. The disturbed decorative panels were set in to their positions and preservative coat was given to the entire wood work. All the openings of the building were provided with iron grills. Breaches in the compound

wall were also attended to in R.R. masonry to prevent entry of animals and anti-social elements.

Jaipur Circle

RAJASTHAN

190. MARBLE PAVILION AND BALUSTRADE AND THE MARBLE HAMMAM, ANASAGAR BANDH, AJMER, DISTRICT AJMER.— Restoration of collapsed arches of Khan-m-Khan Gateway as per original design with new marble stone matching colour and texture is in progress.

191. ANCIENT SITE, BHANGARH, DISTRICT ALWAR.— The buried southern outer fortification wall upto second bastion was exposed by removing the fallen debris. The partial restoration of the fallen/ missing portion of R.R. masonry wall and bastion was completed.

192. MAQBARA, BHANGARH, DISTRICT ALWAR.— Uneven and loose stone steps leading to the *Maqbara* were dismantled and reset as per original. The sunk pointing of the stone steps, plinth and stone flooring of the *Maqbara* was completed.

193. HANUMANA GATE, BHANGARH, DISTRICT ALWAR.— Reconstruction of the fallen R.R. masonry of fortification wall and restoration of the northern cell, adjacent to it was completed.

194. BAZAR, BHANGARH, DISTRICT ALWAR.— The buried shops (1-30) were exposed and rendered with underpinning and sunk pointing. The work of dismantling the old decayed lime concrete floor and laying fresh lime cement concrete floors in the repaired shops is in progress (pl. LXXXI).

195. LAL MAS JID, TAJARA, DISTRICT ALWAR.— The debris lying in the basement cells of the mosque was removed. The underpinning was done to the masonry walls and columns of the cells. The cells were also provided with lime cement concrete flooring over a layer of stone soling. Steel gates with expanded metal *jali* in the arch openings were fixed to prevent misuse of the monument. An outward slope to the ground in front of the basement for ensuring proper drainage of the rain water away was also provided.

196. FORT-WALL, BHARATPUR, DISTRICT BHARATPUR.— The work of repairing the breached wall on the Gopalgarh side by R.R. masonry is in progress.

197. SAWAN BHAWAN, DIG, DISTRICT BHARATPUR.— Restoration (half-portion) of the fallen roof of Sawan Bhawan with wooden members and brick tile *kharenja* in lime cement mortar was completed.

198. PALACE, BUNDI, DISTRICT BUNDI.— To prevent the water seepage, a layer of tarfelt and bitumen, etc. on the roofs of the painting galleries was provided. The expanded metal *jali* with angle iron frames was provided in the open courtyard and front arch openings of the Chitrasala.

199. SOMNATHA TEMPLE, DEOSOMNATH, DISTRICT DUNGARPUR.— Debris laying in the courtyard of the temple was cleared and structural members sorted out.

200. OLD TEMPLE CHANDERBHAGA, JHALRAPATAN, DISTRICT JHALAWAR.— Refixing of damaged *chhajjas* and watertightening of the roof of the temple was done.

201. FORT, JAISALMER, DISTRICT JAISALMER.— Dismantling the bulged out and damaged lower fortification wall, sorting out of the serviceable material and resetting the same in the original batter and alignment with properly dressed stones in lime cement mortar including providing of weep holes is in progress.

202. SIVA TEMPLE AND TWO GUPTA INSCRIPTIONS, CHARCHOMA, DISTRICT KOTA.— To prevent the water seepage, the roof of the temple was dismantled and a fresh layer of lime cement concrete provided. Damaged and missing *chhajja* stones were replaced.

203. FORT, KUMBHALGARH, DISTRICT RAJSAMAND.— Restoration of the fallen portions of the fortification walls near Ram Pol, Halla Pol and Rani Chaura was completed by repairing the wall with R.R. masonry.

Lucknow Circle

UTTAR PRADESH

204. KHUSRUBAGH, ALLAHABAD, DISTRICT ALLAHABAD.— Resetting of rubble stone masonry of the compound wall towards its south side and recessed pointing wherever required were taken up.

205. KYDGANJ CEMETERY, ALLAHABAD, DISTRICT ALLAHABAD.— The work of underpining and plastering the old graves were taken up and is in progress.

206. FORT, KALINJAR, DISTRICT BANDA.— In continuation of previous year' s work *(1990-91,* p. 137) conservation work at Neelkanth temple was taken up which included resetting of stone masonry wall, recessed pointing, laying lime cement concrete floor in front of the temple and fixing of iron pipe-railing near the temple. The work is in progress.

Repairs to the Pathar Mahal and Moti Mahal which included removal of malba and debris clearance from inside and around the buildings and resetting and pointing of the exposed structures were also taken up and is in progress.

207. KATCHEHARI CEMETERY, KANPUR, DISTRICT KANPUR.— Pathway is being provided inside the cemetery area to facilitate movement of visitors around the graves. The work is in progress.

208. BRICK TEMPLE, NIBIA KHERA, DISTRICT KANPUR.— Construction of brick boundary wall is in progress.

209. SURANG TEMPLE, DUDHAI, DISTRICT LALITPUR.— The monument was cleaned off vegetaional growth and repaired by underpinning and laying flooring wherever required.

210. ASAF-UD-DAULA'S IMAMBARA, LUCKNOW, DISTRICT LUCKNOW.— In continuation of previous year's work, the north-west corner of the entrance gateway of the forecourt complex was provided with matching mouldings and carvings. The moulded plaster at south-west side of the southern facade was reproduced. Decayed lime concrete of flooring in the main hall near Nawab Asaf-ud-Daula' s grave was reconcreted in patches. The moulded and carved work of piers, pillars, pilasters were attended at prominent points in the northern verandah. The colour of western facade of main building along with projected side wings were matched up to the height of the *chhajja* as per existing original shade.

In upper floor of main chamber of *baoli,* after removing dead and decayed coatings of lime

plaster of ceiling, walls, arches etc. of south-west side room, the fresh lime plaster was provided matching to original design.

211. ASAFI MOSQUE, LUCKNOW, DISTRICT LUCKNOW.— The spongy and peeled off thick layers of plaster of the southern side dome was carefully removed and replastered with thick fine mortar after giving final shape and finishing including reproduction of about 1-5 m high water leaf patterned petals on drum of domes. About seventy five percent area of entire dome was restored including inverted lotus leafs on the apex of dome.

212. JAMA MASJID, LUCKNOW, DISTRICT LUCKNOW.— The richly moulded northern facade above high plinth was replastered as per original pattern and designs.

213. KAZMAIN BUILDING, LUCKNOW, DISTRICT LUCKNOW.—Peeled off and spongy plaster of middle gateway and north-western wing was removed and replastered matching with original design including underpinning with *lakhauri* bricks and concreting the floors and parts of roofs.

214. MUSHIRZADI'S TOMB, LUCKNOW, DISTRICT LUCKNOW.— The decayed lime concrete plaster of roof terrace of 1st floor was taken out and fresh lime concrete laid. The floral design of the ceiling plaster of 1st floor was also attended to by replastering.

215. PICTURE GALLERY, HUSSAINABAD BARADARI, LUCKNOW, DISTRICT LUCKNOW.— After removing the peeled off and spongy plaster from the stucco at western facade and part of north-western facade upto 1st floor level, was reproduced in conformity with original.

216. RESIDENCY BUILDINGS, LUCKNOW, DISTRICT LUCKNOW.—The repairs to treasury building were undertaken by way of underpinning and pointing wherever required and western side wall was also repaired.

217. SAADAT ALI KHAN'S TOMB, LUCKNOW, DISTRICT LUCKNOW.— The ceiling plaster of ground floor was attended to and decorated floral designs reproduced with lime cement mortar matching with original plaster.

The plaster of pillar and wall and other floral design work at the ground floor of Saadat Ali Khan's tomb was also attended to by reproducing the floral design.

218. SHAH NAJAF TOMB, LUCKNOW, DISTRICT LUCKNOW.— South-west corner facade was repaired by underpinning and reproducing the moulded brick-work.

219. SIKANDAR BAGH GATE, LUCKNOW, DISTRICT LUCKNOW.— The compound wall of Sikandar Bagh gate towards Ashok Marg was extended and geometrical design reproduced matching with the design of original plaster of ancient enclosure wall of Sikandar Bagh gate.

Madras Circle

KERALA

220. MATTANCHERY PALACE, COCHIN, DISTRICT ERNAKULAM.— The tiles and reapers of the roof, damaged due to heavy monsoon, were replaced.

221. ST. FRANCIS CHURCH, COCHIN, DISTRICT ERNAKULAM.— The dilapidated eastern balcony was

dismantled and reconstructed after changing the decayed wooden members. The leaky tiles were replaced. Wood preservative was also applied.

222. BEKAL FORT, PALLIKERE, DISTRICT KASARAGOD.— The fallen and out-of-plumb fortification built in laterite stone was dismantled and reconstructed as per original after filling the core with boulders.

223. SIVA TEMPLE, NETRIMANGALAM-PATTAMBI, DISTRICT PALAKKAD.—The damaged roof tiles were replaced. The walls of the shrines were replastered in combination mortar.

203. ROCK-CUT CAVES, VILINJAM, DISTRICT TRIRUVANANTHAPURAM.— The cracks developed on the rock surface were filled. The protected area around the monument was provided with a grill fencing over a toe-wall.

204. JAINA TEMPLE, KITTANGANAD, DISTRICT WAYANAD.— The out-of-plumb wall of the *mandapa* was dismantled and reconstructed as per original after filling the core in brick masonry in combination mortar. The undulated flooring was relaid.

TAMIL NADU

224. KAILASANATHA TEMPLE, KANCHIPURAM, DISTRICT CHINGLEPUT-M.G.R.— The moss and lichen spread over the *angalayas of the prakara* was cleaned. Joints were grouted and recess pointed in cement mortar of matching colour.

225. FIVE RATHAS, MAMALLAPURAM, DISTRICT CHINGLEPUT-M.G.R.— The cracks found over the monolithic *rathas* were pointed to prevent percolation of water. A cut-stone masonry revetment wall to the north was constructed.

226. SHORE TEMPLE, MAMALLAPURAM, DISTRICT CHINGLEPUT-M.G.R.— Dwarf wall for fencing the protected area was constructed.

227. DUTCH FORT AND CEMETERY, SADRAS, DISTRICT CHINGLEPUT -M.G.R.— The highly dilapidated brick masonry fortification was reconstructed on the eastern side over a new foundation in portions using specially manufactured bricks of the size of the original. The original portion was retained wherever available (pl. LXXXII).

228. TIRUPULISVARA TEMPLE, VAYALUR, DISTRICT CHINGLEPUT-M.G.R.— The out-of-plumb *mandapa* of the *mahadvara* was dismantled and reconstructed as per original after providing a suitable raft-foundation. The earthwork revealed the lower mouldings of the structure. The *maha-mandapa* of the Vishnu shrine was reconstructed using the available stones. The missing architectural members like the door-jambs and beams were made either newly or the available ones were mended.

229. MURUGANATHASVAMI TEMPLE, TIRUMURUGANPOONDI, DISTRICT COIMBATORE.— The leaky roof of the *mandapa* of the main shrine was rendered watertight by providing two layers of tiles after removing the decayed weathering-course. The out-of-plumb southern wall of the Balasubrahmanya shrine was dismantled and reconstructed as per original after strengthening the new foundation. Its roof was watertightened. Similar work was done to the Nataraja shrine also.

230. PARTHASARATHY KRISHNA TEMPLE, PARVATHIPURAM, DISTRICT KANYAKUMARI.— The decayed

wooden rafters and the beams were replaced with new ones matching the original. The tiled roof was relaid. Wood preservative was applied to all wooden members.

231. BHAKTAVATSALA TEMPLE, CHERANMADEVI, DISTRICT KATTABOMMAN.—The decayed weathering course over the *maha-mandapa* was removed and a fresh course of brick jelly in lime mortar topped by a layer of tiles was provided.

232. OFFICERS MESS, FORT ST. GEORGE, MADRAS, DISTRICT MADRAS.—The dead plaster of the ceiling of the ground floor (housing the Chemistry branch) was removed and replastered in cement mortar. Flooring slabs were relaid. The wooden members were enamel painted in grey and the exterior wall surface with cement paint. New drain pipes of larger diameter were provided to the terrace.

233. CLIVE'S BUILDING, FORT ST. GEORGE, MADRAS, DISTRICT MADRAS.—The ceiling of a hall in the rear portion of the ground floor of the building had collapsed when it was under the occupation of Defence. I-section girders, to hold the rafters to the Madras-type ceiling, was positioned in place after providing a brick masonry support over a foundation. The work is in progress.

234. RAMPART, FORT ST. GEORGE, MADRAS, DISTRICT MADRAS.— The fallen parapet of the rampart on the western side was reconstructed in portions after removal of rank vegetation. The bastion of St. George Gate was watertightened in cement concrete. Grills were provided to the area in front of the newly discovered tunnel.

235. FORT, VELLORE, DISTRICT NORTH ARCOT-AMBEDKAR.—The archaeological area in the northern side was fenced to a length of 200 m.

236. JALAKANTHESVARA TEMPLE, VELLORE, DISTRICT NORTH ARCOT-AMBEDKAR.— A broken beam supporting the *kapota* of the *kalyana-mandapa* was mended by inserting I-section rails in grooves. The dismantled *kapota* portion was re-erected as per original after filling the missing portion with new stones matching the old in design. The sunken flooring of the *kalyana-mandapa* was relaid and pointed. An apron was provided on either side of the *mahadvara.* The pathway in front of the outer *mahadvara* was paved with slabs. Grill fencing was done to the pitching on the west. A new brick masonry drain was provided to the *prakara.*

237. OLD COLLECTORATE BUILDING, FORT, VELLORE, DISTRICT NORTH ARCOT-AMBEDKAR.—Masonry pedestals were erected for exhibiting the loose sculptures collected during the conservation of protected monuments in the district. Necessary minor repairs were undertaken to this building after taking it over from the State Government.

238. JAINA TEMPLE, METTUPUDUR, DISTRICT PERIYAR.—The out-of-plumb outer veneer of the *maha-mandapa* was dismantled after proper documentation. A new foundation was laid and the wall was reconstructed as per original. Broken beams were replaced with new ones. Accretionary brick walls were removed and reconstructed with available stone members. The roof was rendered watertight by paving tiles over cement mortar.

239. MUCHUKUNDESVARA TEMPLE, KODUMBALUR, DISTRICT PUDUKKOTTAI.— The dismantled *maha-mandapa* was reconstructed as per original after strengthening the foundation. Similar repair was done to the pillared *mukha-mandapa* too. An apron of slabs was provided to prevent percolation of water into

the foundation. The roof of the *mandapas* were watertightened (pl. LXXXIII). Pointing was done to the joints of *sikhara* of the main *vimana*.

240. BHUMISVARA TEMPLE, SEVALUR, DISTRICT PUDUKKOTTAI.— The dismantled members of the *mukha-mandapa* and the *maha-mandapa* were reset as per original over a new foundation. The roof of the *mandapas* was rendered watertight by laying flat-tiles over brick jelly course.

241. SIVA TEMPLE, TENNANGUDI, DISTRICT PUDUKKOTTAI.— Rank vegetation grown over the *sikhara* and over the roof of the *mandapas* were removed and the roof was watertightened. An accretionary wall and accumulated debris around the temple was removed. Flooring of the *maha-mandapa* and *ardha-mandapa* was reconditioned. Necessary pointing was done to the voids of the walls of the main shrine and Amman shrine (pl. LXXXIV).

242. SIVA TEMPLE, THODAIYUR, DISTRICT PUDUKKOTTAI.— The rank vegetation grown around the temple and the eroded earth of the bund was excavated. With the result, the outline of the *prakara, Amman* shrine and *mukhamandapa* were traced. The out-of-plumbmaha-mandapa wall was dismantled after due documentation and the same was reconstructed as per original after providing suitable foundation. In the process broken beams and capitals, ceiling slabs were replaced. The roof was rendered watertight. A cut-stone revetment wall was constructed against the tank bund to avoid caving in of the earth.

243. NARASIMHASVAMI TEMPLE, NAMAKKAL, DISTRICT SALEM.— The out-of-plumb east and south outer veneer of the Lakshminarayana shrine was dismantled and reconstructed as per original. The sunken flight of steps at the main and northern entrances were reset. The leaky roof was watertightened. Flagstones were provided around the sub-shrine to stop the rain water seeping into the foundation. A brick accretionary wall on the front was removed and iron grills were provided.

244. RANGANATHASVAMI TEMPLE, NAMAKKAL, DISTRICT SALEM.— The broken beams and roof-slabs were replaced with new ones and the roof was watertightened. A sky-light opening was made to get more light.

245. KALYANA MAHAL, GINGEE, DISTRICT SOUTH ARCOT.— In continuation of works carried out in the previous years, the finial portion of the *mahal* was conserved. Missing *kapota* portions were provided. The original entrance from the west was restored and the postern on the north-west was also opened by removing the accretionary walls. The arches and the pillars were conserved. The original flooring was traced after removal of accumulated earth.

246. RAJAGIRI FORT, GINGEE, DISTRICT SOUTH ARCOT.— The newly exposed throne platform was conserved properly by reconstructing the fallen portion and mending the polished covering stone. A portion of the so-called stables, located to the north of the palace structures, was conserved by reconstructing the walls, pillars and the arches as per available clues and in matching masonry. Steps to Rajagiri were reset. Missing portions of the *kapota* of the granery were reconstructed with suitable bricks and plastered with lime mortar with matching colour finish.

247. RANGANATHA AND BALARANGANATHA TEMPLES, RAJAGIRI FORT, GINGEE DISTRICT- SOUTH ARCOT.— The stucco figures on the *vimana* of the shrines were mended. The roof of the axial *mandapas* of the shrines were rendered watertight after removing the decayed weathering course.

248. PATTABHIRAMA TEMPLE, NARASINGARAYANPETTAI, DISTRICT SOUTH ARCOT.— The *brahmanrantra* and the *maha-nasika* of the *Raya-gopuram* was damaged in the past by lightening. It was brought to its original form by reconstruction in brick masonry using bricks of ancient size. The *nasika-dvara* of the *talas* in the *gopura* were devoid of lintels leading to vertical cracks in the *gopura* over the openings. R.C.C. lintels were provided and given wooden-finish.

249. NITISVARASVAMI TEMPLE, SRIMUSHNAM, DISTRICT SOUTH ARCOT.—I-section girder was provided to one of the broken beam in the *mukha-mandapa* of the Amman shrine.

250. BRIHADESVARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR.— The existing cement modelled portion of the *kapota* of the *Rajarajan-tiruvasal,* the outer *maha-dvara* was replaced in stone matching the original in design. The damaged flooring of the *maha-mandapa,* eastern cloister *mandapa, vahana-mandapa* on the south of the cloister, and the Thiyagaraja-mandapa and the sub-shrine in the cloister was relaid. The decayed plaster on the Maratha arch, Thiyagaraja *mandapa* was removed and the walls were replastered in combination mortar. The stucco figures on the *Keralantakan-tiruvasal,* the inner *maha-dvara* were cleaned to remove the thick layer of moss and lichen spread over them. Damaged figures were strengthened. Earthwork was done on the southern side in between the gopuras so as to expose the *adhishthana* mouldings.

251. BRIHADESVARA TEMPLE, GANGAIKONDACHOLAPURAM, DISTRICT TRICKY.— The outer veneer of the northern portion of the main entrance was dismantled and reconstructed as per original and the missing architectural members were provided matching with the original (pl. LXXXV). The top *tala* of the southern portion of the same was erected. The roof of the *talas* on either side of the main entrance was rendered watertight. The accumulated debris in front of the entrance to the north of it was cleared. While executing this work an ancient structure-moulded *adhishthana-was* encountered. This also facilitated easy outflow of rain-water from the temple-complex while preventing the inflow of the same.

252. SIVA TEMPLE, VALIKANTAPURAM, DISTRICT TRICHY.— The stucco figures on the *vimana* and the *gopura* were mended using ground mortar after cleaning the moss and lichen with cleaning agents. The roof of the *maha-mandapa* was given *surkhi* course topped by a flat tiled layer after removing the dead weathering course. The flooring was relaid.

253. ROCK-CUT TEMPLE AND SCULPTURES, SIYAMANGALAM, DISTRICT TIRUVANNAMALAI-SAMBUVARAYAR.— The damaged stucco figures of the *gopura* of the *maha-dvara* were mended first by filling the voids with brick-bats in combination mortar and then the figures were strengthened as per original in specially ground stucco.

Mini Circle, Goa

GOA

254. FORT AGUADA, CANDOLIM, DISTRICT NORTH GOA.— The removal of rank vegetation and uprooting trees from the walls were attended. The iron grill work measuring 6.50 X 1.50 m was fixed at the top of water channel inside the upper fort, inorder to provide safety to the life of the visitor.

255. BASILICA OF BOM JESUS, OLD GOA, DISTRICT NORTH GOA.—Three phased electrical connection was provided in place of single phased installation, which enhanced the feeding load consumed by the lighting system of the said monument. This also caters to the heavily required consumption during the Novina and other such recurring feasts and festivals. Old western type toilets were replaced by the new foot rest type and the tank supplying water to it was repaired.

256. MUSEUM, OLD GOA, DISTRICT NORTH GOA.— The plastering of ceiling and the vertical walls of the Museum office was attended to. The floorings of the Quadrangle gallery and office portion were laid with cement concrete with proper gradient and plastered with cement mortar.

The adjacent ancillary portion of the museum building connecting the hall of reserved collection and the residential portion were stregthened by replacing twenty decayed wooden beams. Resetting of disturbed laterite ceiling stones and plastering were also attended to.

257. SAFA MASJID, PONDA, DISTRICT NORTH GOA.—The protected area was fenced with barbed wire with precast reinforced concrete pillars at the interval. Two gates, one on the north and the other on south were fixed together with four turn style gates at convenient places for exit purpose. The old decayed wooden frames and shutters were removed and iron windows fixed with acrylic sheets.

258. SE'CATHEDRAL CHURCH, OLD GOA, DISTRICT NORTH GOA.— The outer walls of the church were plastered and the doors and windows painted. The decayed wooden beams, rafters and ceiling planks of the roof above the main altar on the north-west were replaced by new ones and wood preservative was applied to the beams and rafters.

259. ST. ASSISI CHURCH, OLD GOA, DISTRICT NORTH GOA.— The portrait painting, on the southern side, fallen down earlier, was refixed by strengthening the whole frame of the painting and by using wooden fixtures. G.I. gutters were provided on the northern and southern side of the walls.

260. ST. AUGUSTINE CHURCH, OLD GOA, DISTRICT NORTH GOA.— The crevices found in the exposed walls, pillars and pilasters of the said complex were consolidated. Watertightening at the top of the exposed walls was carried out in the portion of the adjacent convent.

Mini Circle, Shimla

HIMACHAL PRADESH

261. LAXMI-NARAYAN TEMPLE, CHAMBA, DISTRICT CHAMBA.— Laxminarayan temple were grouted, and fallen patch of plaster was restored as per original. The missing stone slate of the roof were also provided.

262. SIVA TEMPLE, BAIJNATH, DISTRICT KANGRA.— The terrace of temple was watertightened with fresh lime concrete after dismantling the dead one.

263. KOTLA FORT, KOTLA, DISTRICT KANGRA.— Fallen and disturbed patches of stone masonry were reconstructed and joints pointed.

264. KANGRA FORT, KANGRA, DISTRICT KANGRA.— The roof of the sculptural shed was provided with brick-tiles.

265. BUDDHIST MONASTERIES, TABO, DISTRICT LAHAUL AND SPITI.— The work of providing stone pathway over a lime concrete base was completed. The work of stablizing the foundation, pointing and plastering the wall of the Byamba Lhakhang, Hbrom-ton Lhakhang, Tsug-Lhakhang, Go-khang and *chortens* were taken up and completed.

266. PHOO GUMPHA, TABO, DISTRICT LAHUL AND SPITI.— The outer walls of Gumpha were replastered.

Patna Circle

BIHAR

267. ANCIENT SITE OF VIKRAMASILA MONASTERY, ANTICTAK, DISTRICT BHAGALPUR.— Damaged structures were repaired by underpinning, pointing and watertightening. The *nallah* was diverted to check the percolation of rain water into the structures.

268. ANCIENT SITE, KOLHUA, DISTRICT MUZAFFARPUR.— The structures recently excavated were consolidated by watertightening and recess pointing.

269. ANCIENT SITE, NALANDA, DISTRICT NALANDA.— Repairs to the damaged portions of Monastery 6 were attended to by watertightening, underpinning and recess pointing.

270. ANCIENT SITE, VAISHALI, DISTRICT VAISHALI.— The exposed structures were consolidated by recess pointing and watertightening the upper courses. Domical shed over the relic stupa was installed.

UTTAR PRADESH

271. BUDDHIST REMAINS, KUSHINAGAR, DISTRICT DEORIA.— Subsidiary structures around the Ramabhar stupa were repaired by watertightening the top courses and recess pointing. Lightening conductor was provided over *chhatri* of Nirvana Stupa.

272. EXCAVATED REMAINS, SAIDPUR BHITARI, DISTRICT GHAZIPUR.— The protected area was fenced with barbed wire to prevent encroachments.

273. FORT, JAUNPUR, DISTRICT JAUNPUR.— Missing portion of fortification on northern side was restored as per the original. Inner wall and the top portion was also restored with *lakhauri* bricks.

274. IFTIKHAR KHAN'S TOMB, CHUNAR, DISTRICT MIRZAPUR.— The disloged chunks of plaster from the walls and floor were removed and replastered as per the original.

275. BUDDHIST SITE, SARNATH, DISTRICT VARANASI.— The area on the north side of the Chaukhandi stupa was cleared and structures exposed. The exposed structures were restored as per the original.

Srinagar Circle

JAMMU AND KASHMIR

276. GROUP OF ANCIENT TEMPLES, BILLAWAR, DISTRICT KATHUA.— The out-of-plumb and partly fallen wall on the north side of the *mandapa* of the Siva temple was dismantled and restored in stone masonry as per the original.

277. PALACE, LEH, DISTRICT LEH (LADAKH).— The crumbled walls of the rooms in the central west section at levels 6 and 7 were dismantled and restored to match with the original. The wooden doors, windows and false ceilings were also replaced. The tops of the rooms were also watertightened (pl. LXXXVI).

278. STUPA AT TISSERU, DISTRICT LEH (LADAKH).— The missing circular wall of the stupa at lower terrace on the west side was restored in stone masonry to emulate the original (pl. LXXXVII).

279. GROUP OF TEMPLES, BABOUR, DISTRICT UDHAMPUR.— The bulged-out right half of the *mandapa* wall on the west side of the Dera temple was dismantled and reset (pl. LXXXVIII). The temple of Devi Bhagwati was also provided with flagstone pathway and a garden.

280. PALACES AT RAMNAGAR, DISTRICT UDHAMPUR.— Partly fallen and missing retaining wall in front of the old and Nawa Mahal complexes was restored in stone and country brick masonry (pl. LXXXIX).

281. FORT, RAMNAGAR, DISTRICT UDHAMPUR.— The damaged and cracked top portion of the north eastern bastion was dismantled and restored in stone masonry and the joints were pointed in *lime-surkhi* mortar as per the original.

Vadodara

Circle DAMAN

AND DIU

282. FORT WALL (S.O.S.), DAMAN.— The sunken and dilapidated ashlar stone masonry and core in random rubble and brick bat was rebuilt with new stones.

283. MONUMENTS, DIU.— The area around was fenced. The worn-out and decayed flooring was relaid with new Bela Stones. Old wiring was replaced with new wiring of good quality. The wooden beams, *jalis* were cleaned.

GUJARAT

284. MONUMENTS, SARKHEJ, DISTRICT AHMEDABAD.— The decayed wooden beams supporting the entrance porch roof were removed and replaced with new ones. The bulged ashlar stone masonry was dismantled and reconstructed with new Dhangadhra stones.

285. DARBARGADH, SIHOR, DISTRICT BHAVNAGAR.—The broken country tiles and wooden members of the roof were replaced with new ones. Underpinning and plastering work was also taken up.

286. BENI MADHAVA TEMPLE, DWARKA, DISTRICT JAMNAGAR.—Dressing and carving of stones were carried out for further work.

287. SUN TEMPLE, MODHERA, DISTRICT MAHESANA.— The missing architectural members of the *sikhara* and *chhajja* were restored with Dhangadhra stones as per the original.

288. SURYA KUND, MODHERA, DISTRICT MAHESANA.— The dilapidated ashlar sandstone masonry steps with hearting was dismantled and reset in lime concrete. The weathered and decayed stones were replaced with new Dhangadhra sandstones. The original few layers where moulding and carving existed were reproduced as per original pattern (pl. XC).

289. MALAI MATA TEMPLE, PALODAR, DISTRICT MAHESANA.— Tilted, out-of-plumb ashlar stone masonry as well as modern brick masonry wall were dismantled and reconstructed. Missing pavement was provided with new Dhangadhra stones.

290. SHASTRALINGA TANK, PATAN, DISTRICT MAHESANA.— Repairs to the out-of-plumb and ashlar stone masonry were carried out. The debris was removed. Repairs to the brick masonry was also carried out.

291. JAMI MASJID, PAVAGADH, DISTRICT PANCHMAHALS.— The out-of-plumb and bulged ashlar stone masonry as well as random rubble stone masonry was dismantled and reconstructed as per original pattern.

292. KEVDA MASJID, PAVAGADH, DISTRICT PANCHMAHALS.— To avoid encroachment and facilitate horticultural work, barbed wire fencing was provided around the mosque.

293. OLD ENGLISH TOMBS, SURAT, DISTRICT SURAT.— The old and decayed plaster of the walls, pillars, domes and arches including floral designs and motifs were raked out and replastered.

294. NAVLAKHA TEMPLE, SEJAKPUR, DISTRICT SURENDRANAGAR.— Brick-bat masonry was carried out after dismantling the heavily carved masonry. Badly decayed wooden beams were replaced with new wooden beams.

MONUMENTS MAINTAINED BY THE STATES

ANDHRA PRADESH

The Department of Archaeology and Museums, Government of Andhra Pradesh carried out the major conservation works at the following monuments :

1. QUTB SHAHI TOMB, GOLKONDA, DISTRICT HYDERABAD.
2. FORT, KONDAPALLI, DISTRICT KRISHNA.
3. TRIKUTA TEMPLE, NIDIKONDA, DISTRICT WARANGAL.

Assam

The Directorate of Archaeology, Government of Assam carried out conservation works at the following monuments :

4. DEO-PARBAT RUINS, NUMALIGARH, DISTRICT GOLAGHAT.— The heavy carved stone blocks and sculptures were arranged.

5. RUDRESWAR TEMPLE, NORTH GUWAHATI, DISTRICT KAMRUP.— The walls and the entrances of the temple were repaired by using old bricks in lime *surkhi* mortar and plastered.

6. KAMAKHYA TEMPLE, NILACHAL HILL, DISTRICT KAMRUP.—The dome and the wall of the temple was chemically treated.

7. SIDDHESWAR TEMPLE, SUALKHUCHI, DISTRICT KAMRUP.— The works of underpinning and grouting wherever necessary were carried out.

8. RAJBARI RUINS, HOJAI, DISTRICT NAUGAON.— Site gallery for display of loose sculptures was constructed.

9. SIVA TEMPLE, RUDRASAGAR, DISTRICT SIBSAGAR.— The plinth around the temple and *mandapa* was exposed and preserved by using lime *surkhi* mortar in old brick masonry.

10. BORPATRA VISHNUDOL, KALUGAON, DISTRICT SIBSAGAR.— The vegetation was eradicated. The terrace was lime concreted. Apron around the temple was provided.

11. VISHNUDOL AND DEVIDOL, NAMTI, DISTRICT SIBSAGAR.— The temple complex was improved by eradicating vegetation and plastering and providing apron around the temples.

12. JAGADDHATRI DOL, KALUGAON, DISTRICT SIBSAGAR.— Uprooting the vegetation, grouting and concreting the terrace was taken up.

DELHI

The Department of Archaeology, Government of National Capital Territory of Delhi carried out conservation works at the following monuments :

13. CHAUMCHI TOMB, DELHI.— Corner *chhatri* of the tomb was conserved by grouting and pointing the joints.

14. DARA SHIKOH LIBRARY BUILDING, KASHMIRI GATE, DELHI.— The corners of the projected exterior parapet were repaired.

KARNATAKA

Conservation works were carried out at the following monuments by the Directorate of Archaeology and Museums, Government of Karnataka.

15. KITTUR RANI CHANNAMMA PALACE, KITTUR, DISTRICT BELGAUM.— The dilapidated walls of the rooms were restored by providing floors and veneering stones.

16. ESHWARA TEMPLE, JALASANGHI, DISTRICT BIDAR.— The dilapidated veneering stones of the walls were dismantled and reset. Missing slates and beams of the roof were reset with new ones. The leaking terrace was provided with weather proof course.

17. YOGANARASIMHASWAMY TEMPLE, BAGGORVALLI TARIKERE, DISTRICT CHIKKAMAGALUR.— The cracks and cleveges developed on the portion left of the main entrance were removed and reset. The *mandapa* was also reset by removing the existing columns, beams and roof slabs. The area around was provided with stone pavement.

18. BHIMESWARA AND NAKULESWARA TEMPLES, KAIWARA, DISTRICT KOLAR.— In order to drain out the rain water and providing pavement around the temple, the vegetational growth was cleaned and the ground was levelled. The roof of the temple was provided with weather proof course.

19. MADHUGIRI TEMPLE COMPLEX, MADHUGIRI, DISTRICT TUMKUR.— The broken beams of the exit of the *navarana* of Venkataramanswamy temple was removed and replaced with new beams as per the original. The unused doors were removed and replaced with new ones. The leaky roof was provided with weather proofing course.

MANIPUR

The Department of Archaeology, Government of Manipur carried out conservation works at following monuments :

20. TEMPLE OF BRINAMCHANDRA, KANGLA, DISTRICT IMPHAL.— The old flight of steps of the four main facade of the temple were restored and upper terrace was watertightened.

21. GATEWAY, LANGTHABAL, DISTRICT IMPHAL. — The work of removing the damaged plaster at various places and replastering of the same and grouting were carried out with a combination mortar. The plinth of the platform was strengthened and steps watertightened.

22. SAMADHI or-- MAHARAJA KHABA, URIPOK, DISTRICT IMPHAL.—The loose and bulged out patches of the plaster of the outer faces of the walls and roof were raked out and replastered with a combination mortar. The thick vegetation around the monument was removed and the area levelled and reconditioned.

X. EXPEDITION OUTSIDE INDIA

PRESERVATION OF ANGKORVAT, SIEM REAP, CAMBODIA

In continuation of the previous year's work *(1990-91,* pp. 148-150), the team of the Survey resumed the work of conservation of the Angkor Vat Temple complex at Siem-Reap, Cambodia, under the bilateral agreement between the Governments of India and Cambodia under the direction of B. Narasimhaiah assisted by M.M. Raichur, H. Mangiraj, R.J. Motawala, Rajbir Singh, M.S. R.K., Prasad, J. Ranganath, S. Jayakaran, Ravi Kant, R.S. Bisht, S.P. Singaram, M.I. Shaikh, Hazari Lai, Bheru Lai, Nand Lai and Chanderpal. During this season, the conservation work was carried out at Western Wing Gallery on Northern Side of Third Enclosure; Eastern Wing Gallery on Northern side of Third Enclosure; Northern Wing Gallery on Eastern side of Third Enclosure; Southern Central Entrance Porch of Third Enclosure; Southern Entrance Porch at Eastern Corner of Third Enclosure; Inner Porch of Entrance South of Eastern Central Entrance of Third Enclosure; Inner Porch of Eastern Central Entrance of Third Enclosure; Inner Porch of Entrance North of Eastern Central Entrance of Third Enclosure; Eastern Entrance at North Corner of Second Enclosure; Eastern Central Entrance of Second Enclosure; Eastern Entrance at South Corner of Second Enclosure; Southern Entrance at East Corner of Second Enclosure; Southern Central Entrance of Second Enclosure; Southern Entrance at West Corner of Second Enclosure; Western Entance at South Corner of Second Enclosure; Southeast Corner Entrance Pavilion of Third Enclosure; Entrance Pavilion South of Eastern Central Entrance of Third Enclosure; Southern Library between Third and Fourth Enclosures; and Conservation of Towers of First and Second Enclosures. Apart from these, work of providing welded mesh to the First Enclosure and conservation of chemically treated area was also taken up.

STRUCTURAL CONSERVATION : All the outer pillars of the galleries with semi-vaulted roof of the Western Wing Gallery on northern side of Third Enclosure are leaning out, and due to this the so-called cracks in the tie-beams have widened. This phenomenon is generally attributed to the failure of the foundation, or to the sinking of the main pillars of the main galleries. However, our study has shown that this phenomenon is only due to an engineering error committed during the original construction. Further, the cracks in the tie-beams are not actually cracks, as each beam is made of two parts: one projecting from the main pillar, and the other resting over the outer pillar, but connected to the projected part. Therefore, the cracks is nothing but a joint between two parts. Regarding the settlement of foundation, there is no evidences of sinking or disturbance of any architectural member of the plinth. The settlement of main pillars of the main gallery cannot be accpeted as there is no evidence. The architectural members resting over the main pillar do not show any sign of buckling or widening of joints. They are in perfect original horizontal level, with paper thin joints. However, the horizontal level on the whole at the top of the main pillars shows little sagging at the centre of the gallery, which is also

repeated in the original flooring. Therefore, the height from the floor level to the horizontal level at the top of the outer pillars is in perfect line. In addition, the stones of the topmost course of the roof of the semi-vaulted roof of the verandah, are socketed into a groove cut in the main beams of the main gallery. Ultimate result of these errors was that the thrust of the semi-vaulted roof, which is towards exterior, could very easily dislodge the tie-beam at the joint and push the outer pillars out of plumb. If tie-beams were to be made of single stones and horizontal levels at the top of the main pillars and the outer pillars are to be at same height, this phenomenon would not have occurred. Therefore, the remedy was to make the tie-beam to act like one for which it was provided and bring back the outer pillars to their original plumb and maintain the horizontal level of the tie beams.

Western Wing Gallery on north side of Third Enclosure was the most affected one in the whole complex. The joints of some of the tie-beams had widened by 4 to 5 cm and the outer pillars had gone out of plumb by 2 to 3 cm. As precautionary measure buttresses had been provided from outside to the leaning pillars, and the iron belts had been given between outer pillar and the main pillar, by the earlier conservators. But these precautionary measures were not only giving ugly look, but also blocked easy access to the gallery. Therefore, this gallery which was in precarious condition was taken up for conservation.

In the first instance, strong suitable supports were given from inside to the upper courses of the semi-vaulted roof and tie-beam, and then the courses immediately over the beams were dismantled. The beams thus freed were jacked up and the pillar which became free of any load was brought to its original plumb. The beams were reset over it in their proper positions. Ultimately, the tie-beam was reset in its perfect horizontal position after applying epoxy resin between the two parts of the tie-beam. In addition to arrest the recurrence, steel dowels were provided between parts of the tie-beam, between outer beams and tie-beam and between two outer beams. Thus, all architectural members including the main pillar share the thrust of the roof, as they were interconnected and act like one block. All the props, buttresses and iron belts were removed, and the gallery has free access now. Likewise, Eastern Wing Gallery on northern side and Northern Wing Gallery on eastern side of Third Enclosures were also conserved (pl. XCI).

All the members of the plinth and the flooring of the Southern Central Entrance Porch of Third Enclosure numbering more than eighty which had been dismantled earlier were identified and reset in their proper original positions. One of the pillars which had broken and developed cracks was mended suitably and made fit for reuse. In addition, fifteen dislodged members of the eastern pilaster, which had to take the weight of the superstructure were dismantled and reset as per the original, and also were clamped with the wall portion of the entrance, as a precautionary measure. After erecting the four pillars in their proper position, five beams were placed over them. Then the available members of the superstructure (vaulted-roof) were identified from the stacked lot and reset. Further, the decorative *torana* (pediment) over the entrance was found out-of-plumb and was in danger of collapsing. Therefore eighteen architectural members of this *torana* were dismantled and reset to their original position. The structure was throughly watertightened by grouting and pointing.

Southern Entrance Porch at East Corner of Third Enclosure which had been dismantled by the French team before 1970, had been reconstructed up to the floor level by the previous team. Before taking up the reconstruction work, one of the pillars which had been broken and developed cracks was suitably mended by providing concealed I-section girder, and the cracks were thereafter filled with epoxy resin. Likewise, the front beam which was in two pieces was also mended by providing two concealed I-section girders.

Two pillars including the mended one were erected in their proper position and after fixing the beams over them the available roof members were placed.

The Inner Porch of Entrance South of Eastern Central Entrance Enclosure had been dismantled completely upto the foundation, and after strengthening the foundation and the core, it had been reconstructed upto the floor level during the last season's work. However, this season, before executing the reconstruction work, one of the pillars, which had broken into two pieces, was mended suitably after providing concealed steel rods. The other missing pillar was cast in RCC. In addition, a beam which had broken into three pieces was mended by introducing concealed I-section girder. After erecting the pillars, the two beams were placed in their position, and the available stone members of the roof were then reset in their proper position. Altogether , fourteen architectural members were reused in the reconstruction. The structure was watertigthened by grouting and pointing.

The entire Inner Porch of Eastern Central Entrance of Third Enclosure was leaning away from the entrance of the main structure. Due to this a wide gap had formed between the wall of the entrance and the porch. In addition some of the members of the superstructures and the flooring had been dislodged due to heavy vegetational growth. Further, one of the beams had broken and collapsed. Therefore, the entire structure had to be dismantled and reconstructed. After dismantling the porch and removal of vegetational growth from the joints of the flooring and the plinth the dislodged members of the plinth and the flooring were reset as per the original. The broken beam was mended and strengthened suitably. Then the porch was reconstructed as per the original.

All the entire Inner Porch of Entrance North of Eastern Central Entrance was dismantled. After removing the vegetational growth from the core of the plinth and the flooring, and grouting the joints, the stone members of the plinth and the flooring were reset as per the original. Interestingly, one of the pillars had developed cracks, and from that thick vegetational growth was coming out. This pillar was thoroughly mended and strengthened and made fit for reuse. In addition, the pilasters on either side of the entrance, which take the load of the superstructure, are suitably mended and strengthened. Further, two members of the roof were also mended. The pillars were therefore placed in their proper position, and the superstructure (vaulted-roof) was reconstructed and watertightened by grouting and pointing.

Flight of steps flanked by massive balustrades representing double plinth of the Eastern Entrance at North Corner of Second Enclosure, was in a dilapidated condition, due to heavy vegetation growth. Some of the stone members had dislodged and some had been thrown down and joints in the masonry had widened. Altogether these members were reset in their position in the balustrade and the landings.

For the purpose of lifting heavy stones special type of scaffolding had to be constructed, as there no derrick pole was available.

All the dislodged stone members of Eastern Central Entrance of Second Enclosure were fixed in their position. The structure was watertightened by filling up the gaps and crevices and grouting and pointing the joints in the masonry.

The dislodged stone members of Eastern Entrance at South Corner of Second Enclosure were refixed in their proper position and the cavities, gaps and joints were grouted and pointed suitably.

Some of the portions of the balustrades of the Southern Entrance at East Corner of Second Enclosure were dismantled and reset and the structure was watertightened by grouting and pointing.

The collapsed porch and the fallen members of the South Central Entrance of Second Enclosure lying in a heap were identified, removed and neatly stacked after proper documentation. The site was cleared of debris. However, while shifting the architectural members, it was noticed that some of them like pillars, beams, roof-stones had been damaged. Among the broken members, one of the pillars which was in two pieces was thoroughly mended and made fit for reuse. Another pillar was not in a good condition to be mended fully for reuse. Therefore, the major portion of the original pillar which was in good condition was taken, and the missing portion was cast in RCC, and made fit for reuse. In addition, the front and side beams which had been broken into two and three pieces respectively, were also mended and strengthened by providing concealed I-section girders. Besides, eight roof members which had been broken were also suitably mended.

After reconditioning the floor which had crushed and dislodged due to the collapse of superstructure, the four pillars including the mended ones were erected and the beams were then hoisted with the help of chain-pully blocks to their proper position. Altogether forty-six architectural members, retrieved from the debris, were reused in the reconstruction of the porch.

The flight of steps flanked by massive balustrades of the entrance was conserved in all respects including resetting of dislodged members, lifting and fixing of the fallen members, grouting and pointing.

The dislodged flight of steps and balustrades of the Southern Entrance at West Corner of Second Enclosure were reset in their proper position and all the joints and gaps were thoroughly grouted and pointed.

The area between the two entrances of the Western Entrance at South Corner of Second Enclosure was cleared as it was strewn with stone architectural members were removed and stacked at a distance from the entrance. Thereafter as many as eight architectural members were dismantled and reset, and another twenty-seven dislodged stones were reset in their position. Thereafter the structure was watertigthened.

Southeast Corner Entrance Pavilion of Third Enclosure which had been dismantled by the French team, before 1970 was reconstructed completely and the flooring was dressed up. In addition,

watertightening of the superstructure was also completed. A large gap in the roof which was caused by missing roof members was covered with specially cast RCC blocks. The entrance pavilion including southern and eastern porches was completely conserved.

Entrance Pavilion South of Eastern Central Entrance of Third Enclosure, dismantled by the French team prior to 1970, was rebuilt. Wherever the original members were not available laterite blocks were used in place of missing ones. Side opening on the eastern remains to be attended to.

In addition, the flooring dismantled by the French team was reset. Sixteen dismantled members were identified and reset in their proper position, and for the missing four stones, suitably dressed new members were used.

Certain portions of the Southern Library between Third and Fourth Enclosures dismantled long ago and stacked at a distance away without any number were reused in the reconstruction. The missing members were provided with laterite blocks up to the bottom level of the upper course for which the original stones were available. The laterite blocks used in the construction were plastered in suitable colour. The *mandapa* between the central chamber and the porch on the western side was provided with a roof and on the northern side the *mandapa* was provided with *torana* decoration over the entrance.

The architectural members of the Southwestern Corner Tower of First Enclosure were precariously overhanging due to dislodgement as a result of heavy vegetational growth and penetration of rain water into the core of the structure. In addition, gaping holes had formed because of disintegration of stone members as well as due to missing member. The dislodged members were reset in their proper position and the gaps and crevices were suitably filled up with cement concrete. The gaps formed due to missing members were also filled up after strengthening the core. The joints were grouted and pointed, so that rain water does not penetrate into the structure.

The South-west Corner Tower of Second Enclosure was also cleared off all the vegetational growths and the dislodged stone members were reset in their proper position followed by grouting and pointing. Care was taken to fill up all crevices and holes in the masonry, so that no vegetation grows again over the structure. The opening at the top of the tower due to the missing members was sealed by providing RCC slabs. The weathered architectural members, especially the ones supporting the members with cantilever action were strengthened by providing concealed steel rods.

Dislodged stone members of the North-east Corner Tower of Second Enclosure were reset and the top opening was sealed by RCC slabs. Crevices and gaps were filled up. The structure was watertightened by grouting and pointing.

The opening at the top of the North-east Tower of Second Enclosure was sealed with RCC slabs. Internally, all the gaps and joints were filled up and pointed. One of the beams which had almost completely weathered was strengthened by providing I-section girders, and the door frames by providing concealed steel rods. Two badly weathered pilasters were strengthened by providing concealed steel rods. The work on the exterior remains to be attended to.

The enclosure, towers, axial verandahs and *garbhagrihas,* covering an area of more than 675 sq.m were provided with welded mesh. The area which had been chemically treated were watertightened by grouting and pointing.

CHEMICAL PRESERVATION : Chemical cleaning and preservation was carried out in the area covering the interior plinth of the First Enclosure roof and the exterior walls of the ante-chamber between Second and Third Enclosures, quadrangles of the ante-chamber; exterior and interior walls of the Second Enclosure, and north-west and south-west Towers of Second Enclosure. However, interior walls and pillars of the ante-chamber could not be taken up as they contain ancient paintings (sixteenth century AD). The paintings are in three colours like red, green and yellow with black outlines. In addition, many inscriptions were found on the pillars.

The method adopted in chemical cleaning and preservation was as follows : In the first instance, the surface was moistened with water by spraying. Thereafter, the area was cleaned with 1 to 2 percent solution of liquor ammonia, only to neutralize the acids secreted by the hyphae of the micro-vegetation, fixed with teepol, a non-ionic detergent, by brushing gently with nylon brush and tooth brush and soft coir brush, as the case may be, with extreme care. Thereafter the surface was again cleaned thoroughly with water. The area thus cleaned was treated with 2 percent solution of polycide, biocide zinc-silico fluoride, separately. Finally after complete drying of the area, it was preserved by applying a coat of 2 percent solution of polymethylmenthacrylate in toluene (pl. XCII).

XL ARCHAEOLOGICAL CHEMISTRY

TREATMENT OF MONUMENTS AND PAINTINGS[1]

ANDHRA PRADESH

1. RAMESVARASWAMI TEMPLE, TADIPATRI, DISTRICT ANANTAPUR.— Chemical treatment was continued to eradicate vegetational growth from the stone surface with the help of dilute mixture of ammonia and a non-ionic detergent. The lime and sooty accretions were also removed with the help of suitable chemicals and solvents. After thorough cleaning and washing, the surface was subjected to fungicidal treatment which was followed by the application of a preservative coat on completely dried surface.

2. VEERABHADRASVAMI TEMPLE, LEPAKSHI, DISTRICT ANANTAPUR.— The paintings on the ceiling of the *ardha-mandapa* and adjoining Navagraha in *mukha-mandapa* were covered with soot, dust and greasy matter due to burning of camphor. These paintings were subjected to chemical treatment for the removal of these accretionary deposits using various organic solvents *viz.,* triethanolamine, cellosolve, diacetone alcohol, etc., individually or in combination. The work is in progress.

3. CHANDRAGIRI SITE MUSEUM, CHANDRAGIRI, DISTRICT CHITTOOR.—The stone sculptures covered with a variety of accretionary deposits were subjected to chemical treatment. The broken sculptures were mended using epoxy resin. These were given the fungicidal treatment as well as preservative coat.

ASSAM

4. BISHNUDOL TEMPLE, GAURISAGAR, DISTRICT SIBSAGAR.— This temple was subjected to chemical treatment for the removal of vegetational growth with the help of dilute solution of ammonia and teepol with mild brushing. The deep seated black patches of micro-organism were removed by dilute solution of oxalic acid. The chemically treated area was thoroughly washed and subjected to fungicidal treatment with 2% suspension of zinc-silico-fluoride. Finally a preservative coat of 2-4 percent polyvinyl acetate solution in toluene was applied to the dried surface.

5. DEVIDOL TEMPLE, GAURISAGAR, DISTRICT SIBSAGAR.—The thick layer of vegetational growth and deep rooted microphytes from the stone surface were eradicated by treatment with dilute aqueous solution of ammonia and non-ionic detergent-teepol. The use of dilute solution of oxalic acid was also made for more adherent black patches. After thoroughly washing the chemically treated surface,

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[1]Information from : 1-8, 10-18,21 and 24-76, Chemical Branch of the Survey ; 9, Department of Archaeology, Government of Bihar; and 19-20 and 22-23, Department Archaeology, Government of Gujarat.

fungicidal treatment with 2% suspension of zinc-silico-dried fluoride was given. Preservative coat of 2-4% polyvinyl acetate solution in toluene was finally applied to the dried surface.

6. SIBDOL TEMPLE, GAURISAGAR, DISTRICT SIBSAGAR.— The outer surface of this temple covered with thick vegetational accretionary deposit was subjected to chemical treatment with dilute solution of ammonia and teepol detergent. The fungicidal treatment with 2% suspension of zinc-silico-fluoride on the chemically treated and thoroughly washed surface was followed by an application of a preservative coat of 3% polyvinyl acetate solution on the dried surface.

BIHAR

7. EXCAVATED sire AT KOLHUA, DISTRICT MUZAFFARPUR.—The chemical treatment work for the eradication of vegetation growth from the exposed structural remains was initiated during the year. The work is in progress.

8. STRUCTURE OF RELIC STUPA AND RAJA VISUAL KA GARH, VAISHALI, DISTRICT VAISHALI.— The whole area of this excavated site was covered with thick layers of moss, lichen and other microphytes. The biological growth was eradicated by treatment with dilute solution of ammonia. The dust and dirt accretionary deposits were removed using dilute solution of non-ionic detergent teepol and mild brushing. The cleaned areas were given fungicidal treatment with zinc-silico-fluoride and finally a coat of preservative was applied on the dried clean surface. The work is in progress.

9. NEPALI TEMPLE, HAZIPUR, DISTRICT VAISHALI.— The affected portion of the wood was chemically cleaned by organic solvents and mixtures in methyl alcohol, ethye alcohol, benzene, toluene, acetone and ammonia. Thereafter, insecticides were sprayed over and chemically preserved.

DAMAN AND DIU

10. FORT WALLS, MOTI DAMAN.— The northern and southern gates of the fort walls covered with moss, lichen and other accretionary deposits were subjected to chemical treatment with dilute aqueous ammonial solution. The cleaned areas were thoroughly washed with water and given a fungicidal treatment. The dried surface was given a preservative coat of 1% polyvinyl acetate solution in toluene. The work is in progress.

DELHI

11. HUMAYUN'S TOMB, NIZAMMUDDIN, DELHI.— The central arched portion of the entrance of Humayun's tomb was in general affected by thick deposits of dust, dirt and vegetation growth whereas the ceiling portion had dark patches due to the remnants of beehives. The dust, dirt accretions were removed using ammonia-teepol mixture in 2% concentration and the beeswax stains were removed by treatment with petroleum ether. The dark stains from the marble surface which did not yield to above treatment were bleached with hydrogen peroxide. The stone surface was given fungicidal treatment with 1% solution of sodium pentachlorophenate and followed by preservative coat of 2% polymethyl methacrylate (pl. XCIII A).

12. RED FORT, DELHI.- The marble surface of the entire Bhadon pavilion had attained dull and dirty appearance due to the deposition of superficial accretions like dust, soot, dirt, oily matter, etc.

These accretionary deposits were removed by treatment with teepol-ammonia mixture in 2% concentration in aqua medium followed by brushing and thorough washing. The selective use of clay pack treatment was also made for removal of adherent accretions and stains. The work is in progress.

The chemical treatment and preservation work to golden paintings, inlay work and plain marble surface of the Diwan-i-Khas was continued. The work during the period under review was carried out on the interior and exterior of the western and southern corridors. The entire area was having thick accretions of dust, dirt, greasy matter due to constant touching by the visiting public and deposit of soot due to every increasing vehicular traffic on the ring road. The accretions like dust and dirt were removed by the application of ammonia-teepol mixture in 1-2% concentration with mild brushing and thorough washing. The soot and greasy accretions were removed by application of methyl alcohol and triethanolamine mixture. The clay pack method was also employed for the removal of tenacious layers of accretions. The treated area was preserved with 2% solution of polymethyl methacrylate in toluene. The work was completed (pl. XCIII B).

The patches of muddy as well as vegetation accretions of the fortification wall were removed by chemical treatment with teepol-ammonia mixture from the section of the wall between bastion and Lahore gate and three sides of the fortification wall under flag mast and *burjis.*

The central hall of Khas Mahal having the scale of justice and the marble screen work were subjected to chemical treatment for the removal of thick accretionary deposits from the floral designs as well as plain marble surface. The loose dust and dirt from the entire surface was removed by gentle brushing. The areas in between the floral designs were treated stepwise. Initial treatment was carried out by using a mixture of teepol-ammonia and a few drops of triethanolamine with the help of cotton swabs. In the next step, the same area was treated with methyl alcohol for the removal of residual oily matter from the surface. The treated area was preserved with a coat of dilute poly vinyl acetate solution in toluene. The work has been completed.

The marble surface of the Moti Masjid having deposits of soot due to environmental pollution mainly caused by the vehicular traffic on the ring road was subjected to chemical treatment. The thin layer of black accretionary deposit was removed by treatment with a mixture of teepol-ammonia followed by ethanol-triethanolamine mixture and mild brushing. The chemically treated area was thoroughly washed and given a preservative coat on the dry surface.

The green patches developed on the brass metal plates covering the entrance wooden doors to this structure were removed by chemical treatment using alkaline rochelle salt solution. After thoroughly washing to remove the residual traces of the chemicals the dried surface was given a preservative coat of 2% methyl methacrylate solution in toluene. The work was completed.

GOA

13. ARCHAEOLOGICAL MUSEUM, VELHA GOA.— The gilded altars were covered with superficial dust. For the removal of this loose dust deposit, dusting and burnishing was done. A few panel/canvas paintings were chemically treated for the removal of old darkened varnish coat using a suitable mixture of organic solvents.

14. BASILICA OF BOM JESUS, VELHA GOA.—Dust and dirt from the gilded altars was removed by chemical treatment and then burnished with satin cloth.

The silver casket of St. Xavier's body, other silver objects as well as gold plated flower pots.? etc. which had tarnished were chemically treated.

The panel paintings in St. Xavier's room were subjected to chemical treatment for the removal of old darkened varnish layer using a mixture of cellosolve and diacetone alcohol in combination with other organic solvents.

15. SE CATHEDRAL, VELHA GOA.— The gilded wooden altars and furniture were first subjected to general dusting for the removal of superficial dust and dirt. The adhering dust was then removed by chemical treatment and finally the cleaned surface was burnished using a satin cloth.

Two canvas paintings, one near the entrance and the other in the Baptism room were chemically treated and preserved. The canvas painting in the Baptism room which had torn was mended and relined as well. Four small size paintings in small altars were also chemically treated and preserved.

16. ST. CAJETAN CHURCH, VELHA GOA.— The thick layers of old darkened preservative were removed chemically from all the gilded altars after general dusting. These chemically cleaned gilded altars were burnished with a satin cloth and then applied a very thin coat of a fresh preservative.

The canvas and panel paintings were chemically treated to remove the old darkened varnish coat and then given a fresh coat of varnish. The wooden frames of these paintings were given new black oil paint and border was painted with bronze gold powder in polyvinyl acetate solution.

17. ST. FRANCIS ASSISI CHURCH, VELHA GOA.— The main gilded altar as well as the small side altars, polychrome statues, wooden railing, carved wooden stand of St. Francis statue were subjected to dusting, chemical cleaning and burnishing.

The canvas and panel paintings inside chapels were also chemically treated and preserved.

GUJARAT

18. SIDI SAIYAD MOSQUE, AHMEDABAD, DISTRICT AHMEDABAD.— The vegetational accretions were removed by chemical treatment using mixture of dilute ammonia solution and non-ionic detergent. The cleaned surface was given an application of 2% suspension of zinc-silico-fluoride as fungicide. The surface was finally preserved with 2% solution of polyvinyl acetate in toluene.

19. DHARAMSHALA GOPINATH, TALAJA, DISTRICT BHAVNAGAR.— The wall paintings which were damaged due to D.D.T. spray and lime coating were cleaned with cotton in dry condition followed by cleaning with plain water. Lime coating was removed with n-butanol + iso propanol in 1:1 proportion mixture. After cleaning, the wall paintings were preserved with 2% solution of polyvinyl acetate in toluene (sulphur free).

The yellowish stains on marble due to water were removed using paste of China clay and thyoglycollic acid (adding liquid ammonia to neutralize) and then applied to the affected area.

Paper pulp was also applied to the affected area, thickness of paper pulp being 2-5 to 3 cm; solution of thyoglycollic acid + liquid ammonia (added to neutralize) was applied on the paper pulp during regular interval so as to maintain paper pulp in wet condition. Paper pulp was allowed to remain on the affected area upto 48 hours.

20. COPPER COINS, SAYARA, TALUK LAKHPAT, DISTRICT BHUJ.— Six copper coins and two copper pieces found during the cave excavation were treated with alkaline Rochhel salt solution and then with distilled water. After chemical treatment was completed, the coins and pieces were preserved with 2% polyvinyl acetate in toluene (sulphur free) solution.

21. PRADYUMANJI TEMPLE, DWARKA, DISTRICT JAMNAGAR.-~ The outer surface of this temple affected by deposits of dust, dirt, vegetational matter, salts, etc. was subjected to chemical treatment using 2% solution of ammonia and non-ionic detergent. This was followed by fungicidal treatment and finally a preservative coat of 2% polyvinyl acetate solution in toluene. The work is in progress.

22. JAMI MASJID, UPPARKOT, JUNAGADH, DISTRICT JUNAGADH.— The three *mehrabs* of marble disfigured by visitors using red, blue and black ink and pencil was chemically cleaned using solution of acetone, toluene, 3% solution of liquid ammnia + teepol + water, benzene, xylene and kerosene oil.

23. SUN TEMPLE, PRABHAS PATAN, TALUK VERAVAL, DISTRICT JUNAGADH.— Vegetation was eradicated using anti-vegetation solution and tree killer.

24. RANI-KI- VAV, PATAN, DISTRICT MAHESANA,— Sculptures and carvings on the second landing of IInd phase of Rani-ki-Vav were subjected to chemical treatment for the removal of thick vegetational growth. The chemically cleaned surface was thoroughly washed and then given a fungicidal treatment. After complete drying the surface was given a coat of 2% PMMA solution in toluene.

25. JAMI MASJID, PAVAGADH MONUMENTS, CHAMPANER, DISTRICT PANCHMAHAL.— The chemical treatment work for the removal of vegetational growth from the outer portion of the Jarni Masjid was continued using a mixture of dilute ammonia and non-ionic detergent. The cleaned surface was given fungicidal treatment and then preserved with 3% solution of poly vinyl acetate in toluene. The work was completed.

26. KEVDA MASJID, PAVAGADH MONUMENTS, CHAMPANER, DISTRICT PANCHMAHAL.—The chemical treatment work for the removal of thick layers of dried black vegetational growth from outer portion of this masjid was continued. The treated area was given the fungicidal treatment using 2% suspension of zinc-silico-fluoride followed by application of a preservative coat. The work was completed.

HARYANA

27. IBRAHIM'S TOM3, NARNAUL, DISTRICT MOHINDERGARH—The hemispherical dome of Ibrahim's tomb was subjected to chemical treatment for the removal of thick growth of moss and lichens using dilute acqueous solution of ammonia-teepol mixture. The chemically treated surface was thoroughly washed for the removal of any residual traces of chemicals. This surface was then given a fungicidal treatment and finally on the dried surface, two coats of 2% PMMA solution in toluene were applied to consolidate and preserve the surface.

HIMACHAL PRADESH

28. GAURI SHANKAR TEMPLE, DASAL, DISTRICT KULLU.—This temple elaborately decorated with fine carvings including floral designs and figures, etc., was thickly covered with moss, lichen and hard layers of lime plaster.

The moss and lichens were removed with the help of 3% ammonia and 1 % teepol solution. The lime plaster accretionary remains were removed by chemico-mechanical means. The chemically treated surface was thoroughly washed to remove the last traces of chemicals and then given a fungicidal treatment. The dried surface was finally applied two coats of 1% PMMA solution in toluene to consolidate and preserve the treated surface.

29. BUDDHIST MONASTERIES, TABO, DISTRICT LAHUL AND SPITI.— Chemical treatment work for the removal of accretionary deposits of dust, dirt, soot, greasy matter, etc., from the walls of circumambulatory path of the cella of Duwang Gumpa was taken up (pl. XCIV). The superficial accretions of dust, dirt, etc., were removed from the painted surface using sable hair brushes. For the removal of thick mud streaks the upper layers were carefully removed using scalpel and the remaining thin layer/mud stain was removed by careful chemico-mechanical means using methyl alcohol-petroleum ether and, soot and greasy matter was removed using mixture of triethanolamine and methanol in 1:10 ratio containing a small amount of dibutyl phthalate soft drawing brushes. The old preservative coat was removed using toluene in general and mixture of other organic solvents *viz.,* cellosolve, methyl alcohol, ethylene glycol, butyl acetate, acetone, petroleum ether, etc. During the treatment, turpentine was used as a restrainer.

The cracks were filled with plaster of Paris and fevicol to secure the mud plaster portions to the wall. The bulged out portion which could not be pressed back and fixed to the wall was consolidated in the same position by fixing it to the wall with filling of cotton soaked in mixture of fevicol and plaster of Paris. The edges were sealed with plaster of Paris and the repaired areas were colour matched as per demand of the painting.

The chemically cleaned paintings were finally preserved with a very thin coat 0.5 to 1% of polyvinyl acetate solution in toluene containing a few drops of dibutyl phthalate as plasticiser.

30. PANCHAVAKTRA TEMPLE, MANDI, DISTRICT MANDI.— The fine carvings on the outer surface were completely covered by thick layers of lime plaster remains and vegetational growth. The outer surface of the *sikhara* and the *mandapa* were subjected to chemical treatment in two steps. In the first step, dried moss and lichen were removed using dilute solution of ammonia-teepol mixture. In the second step, the lime plaster accretionary remains were removed by chemico-mechanical means using dilute acetic acid solution. The chemically treated surface was thoroughly washed, given fungicidal treatment followed by application of a preservative coat of 2% PMMA solution on the dried surface. The work was completed.

KARNATAKA

31. AMRITESVARA TEMPLE, AMRITAPURA, DISTRICT CHIKMAGALUR.—This temple was subjected to chemical treatment for the removal of thick growth of moss and lichen together with lime smearings.

The cryptogamous growth was eradicated using ammonia-teepol mixture and lime smearings by softening with dilute acetic acid and brushing. The cleaned surface was washed and given fungicidal treatment followed by preservative coat of PMMA on the dried surface.

32. PANCHALINGESVARA TEMPLE, GOVINDANAHALLI, DISTRICT MANDYA.—The Aghoresvara shrine was subjected to chemical treatment for the eradication of micro-vegetational growth and lime wash. The chemically cleaned area was given fungicidal treatment followed by an application of a preservative coat.

33. DARIYA DAULAT BAGH, SRIRANGAPATNA, DISTRICT MANDYA.—The work of fixing up of the loosely hanging canvas paintings to the joints of wooden planks exhibited on the ceiling of the eastern verandah was continued. The work involved the consolidation of the loose, hanging and torn canvas after blowing out the accumulated debris between it and the planks. The stiff and fragile canvas was moistened with alcohol to make it more pliable and then fixed with dilute aqueous solution of an emulsion of polyvinyl acetate. The chemical treatment involved removal of superficial accretions of dust and dirt using chemicals like methyl alcohol, cellosolve and toluene. Finally, 1 % solution of polyvinyl acetate in toluene was applied as preservative.

In the western verandah, the work involved the removal of superficial dust and dirt, removal of old translucent preservative coat, consolidation of the pigment layer and reintegration work.

34. VAIDYESVARA TEMPLE, TALKAD, DISTRICT MYSORE.— The exterior of the main shrine was subjected to chemical treatment for the removal of vegetational growth using mixture of ammonia and non-ionic detergent. The lime wash and calcareous deposits from the ceiling pillars and walls in part were removed by chemico-mechanical means using dilute acetic acid. The chemically cleaned surface was thoroughly washed to remove any traces of acetic acid and then the surface was given fungicidal treatment followed by application of a preservative coat on the dried surface. The broken architectural members were consolidated.

35. GOMMATESVARA STATUE, KARKALA, DISTRICT SOUTH KANARA.— The oily vermillion paste and micro-vegetational growth, lime wash, ochre streaks, etc., from the railings and the statue were removed by chemical treatment. The hair line cracks were filled and consolidated.

KERALA

36. SIVA TEMPLE, PERUVANAM, DISTRICT TRICHUR.— The dust, dirt and oily accretions from the wooden bracket figures and the stone sculptures were removed using dilute ammonia, teepol mixture.

The paintings were subjected to chemical treatment for the removal of superficial dust, dirt, cob-webs, wasp's nests, soot, etc., by general cleaning using organic solvents like toluene, triethanolamine, diacetone alcohol, etc. The painted surface was given preservative coat of 2% polyvinyl acetate in toluene whereas the stone sculptures were preserved with 3% solution of Acrypol-P in toluene.

37. SRI RAMA TEMPLE, TRIPRAYAR, DISTRICT TRICHUR.— The painted panels on the outer surface around the circular *garbhagriha* of the temple were subjected to chemical treatment for the removal of soot, greasy accretionary deposits using a mixture of organic solvents such as cellosolve, diacetone

alcohol, triethanolamine, butyl lactate, morpholine, etc. Thereafter, the painted surface was finally cleaned with toluene and using turpentine as a restrainer. The painted panels were preserved with a very thin coat of polyvinyl acetate in toluene.

The long micro-cracks were consolidated with 5-10% polyvinyl acetate solution whereas the holes and broken edges were filleted with plaster of Paris and colour matched.

MADHVA PRADESH

38. VAMANA TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR.— The chemical treatment work for the removal of moss and lichen growth from the intricate carvings and sculptures on the exterior of the temple as well as removal of thick coat of lime wash was continued. The treated area was given the fungicidal treatment and preservative coat of 2% PMMA in toluene. The eroded sculptures were given 3-4 coats of 1% polyvinyl acetate solution in toluene to consolidate the surface. The work was completed.

39. BAGH CAVES, BAGH, DISTRICT DHAR.— The sculptures of Buddha and *chauri*-bearer in south-eastern corner of Cave 2 which had suffered serious damage due to pulverization of the mother rock were consolidated and strengthened. For this purposes, 5% solution of polyvinyl acetate was injected in the affected portions and then strengthened with plaster of Paris using stainless steel rods for reinforcement.

Cave 2, 3 and 4 were fumigated for the extermination of bats and insects using aluminium phosphide and ethylene dibromide; in Cave 2 and 3 the painted surface was found to be affected by insect activity and was treated with formalin mixed with dichlorovos (DDVP) and baygon solution.

The four panels stripped from Cave 4 and mounted were taken up for chemical preservation. After the removal of old facings, the paintings were cleaned of all the surface dirt and mud accumulation followed by retouching by the artist. Finally, preservative coat of 2% polyvinyl acetate solution was applied. In addition, the bull panel paintings which had earlier been mounted in 1986 was observed to have developed cracks on the backside. It was remounted with freshly prepared ground and support of fibre-glass in epoxy resin.

40. ROCK-CUT JAINA COLOSSI (EK PATHAR KI BAODI),GWALIOR, DISTRICT GWALIOR.— The chemical treatment work for the removal of moss and lichen was continued in Cave 1 to 10. Fungicidal and preservative treatment was also carried cut.

The colossal Jaina images were found to be traditionally lime washed and coated with red ochre resulting in the disfigurement of the structure. The thick coat of lime wash was removed by chemico-mechanical means using dilute acetic acid solution. The remnants of beehive wax stains were removed from the rock surface with the help of organic solvents. The entire cleaned area was given fungicidal treatment with 2% solution of sodium pentachlorophenate and finally preserved with 2% PMMA solution.

41. TOMB OF MOHAMMAD GHAUS, GWALIOR, DISTRICT GWALIOR.— The black dried moss, algae and lichen patches from the vertical wall below the main central dome over the roof alongwith the

projection slabs and four *chhatris* were removed by treatment with dilute ammonia and mild brushing. To prevent the early regrowth of micro-flora, two coats of fungicides-santobrite and zinc silico-fluoride were applied followed by a preservative coat of 2% PMMA on the dried surface.

42. AJAIGARH FORT, AJAIGARH, DISTRICT PANNA.— The loose Jaina sculptures at Ajaigarh fort which were covered with dust, dirt, dried biological growths, lime wash and other stains were subjected to chemical treatment and preserved.

MAHARASHTRA

43. AJANTA CAVES, AJANTA, DISTRICT AURANGABAD.— In Cave 6, the chemical treatment work for the removal of dust, dirt and darkened layer of varnish was taken up on the east wall of the first floor. The old darkened varnish layer obliterating the paintings was removed with the help of a mixture of organic solvents.

In Cave 9, the chemical treatment work was carried out on the paintings on the north and south walls for the removal of thick darkened coat of varnish, shellac and other resins.

The facade of Cave 10 having stains of beehives wax and soot was subjected to chemical treatment. The mixture of solvent naphtha, carbon tertrachloride and chloroform was found to be very effective.

The main Buddha shrines in Cave 4,21, 22,24 and 26 were subjected to chemical treatment. In Cave 4 the painted plaster on sufficient large area is present and was having thick dark accretions which were removed using a mixture of various organic solvents. The consolidation, fixing and filleting of the plaster was also attended to. Finally, polyvinyl acetate coat was applied.

In Cave 21, 22, 24 and 26 there is no painted plaster on the Buddha images and the treatment was carried out using labolene detergent and ammonia mixture. This was followed by application of a preservative coat.

44. BIBI-KA-MAQBARA, AURANGABAD, DISTRICT AURANGABAD.— The entrance area to the tomb was subjected to chemical treatment for the removal of micro vegetational growth from the stone lime plastered surface using 1-2% aqueous ammonia and 1% non-ionic detergent and gentle brushing. The cleaned surface was given a fungicidal coat of 2% sodium pentach' orophenate followed by a preservative coat of 3% PMMA solution on the dried surface. The work is in progress.

45. CAVES, ELLORA, DISTRICT AURANGABAD.— The accretions deposited on the remains of the paintings in the Nandi *mandapa* of Cave 16 were very hard and were not easily yielding to chemical treatment. Asa result, only a small area could be treated to expose beautiful figures with rich ornamental designs.

46. GRISHNESVARA TEMPLE, ELI.ORA, DISTRICT AURANGABAD.— The growth of micro vegetation from the stone and stucco surface was removed by chemical treatment with ammonia teepol mixture and gentle brushing. The hard calcareous deposits at some places on the stone surface were removed by treatment with dilute solution of sodium hexametaphosphate and the black oily accretions of soot

were removed with a mixture of triethanolamine, teepol and ammonia. The cleaned surface was given fungicidal treatment with2% solution of sodium pentach lorophenate and finally on the dried surface, preservative coat of 3% PMMA in toluene was applied.

47. GONDESVARA TEMPLE, SINNER, DISTRICT NASIK.- The stone sculptures inside Gondesvara temple were subjected to chemical treatment with dilute ammonia-teepol mixture. The treated and thoroughly washed surface was given fungicidal coat of 2% aqueous solution of sodium pentach lorophenate and finally when dry was preserved with 3% solution of polymethyl methacrylate in toluene.

48. TRYAMBAKESVARA TEMPLE, TRYAMBAKESVARA, DISTRICT NASIK.— The chemical treatment work was continued for the removal of moss and lichen using 3% aqueous solution of ammonia-teepol mixture. The hard calcareous accretions present at some places were removed by treatment with 2% aqueous solution of sodium hexa metaphosphate. The fungicidal and preservative coats were applied to the cleaned surface. The work was completed.

ORISSA

49. HATHIGUMPHA INSCRIPTION, KHANDAGIRI, BHUBANESWAR, DISTRICT PURI.—The Hathigumpha inscription alongwith adjoining area was subjected to chemical treatment for the removal of dried moss and lichen using dilute ammonia and teepol mixture. The inscription was subjected to paper pulp treatment as well to remove the soluble salts. The cleaned surface was sprayed with 1% zinc-silico-fluoride suspension and finally preserved with 1% acrypol solution in toluene.

50. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT PURI.— The chemical treatment work for the eradication of micro-vegetational growth from the outer surface of *jagamohana, natamandapa* and *bhogamandapa* was continued. The work is in progress.

51. BRAHMESVARA TEMPLE, BHUBANESWAR, DISTRICT PURL— The entire outer surface of the temple was covered with thick layers of dried moss and lichen. These accretions were eradicated by chemical treatment with 1-2% ammonia-teepol mixture. Fungicidal treatment with 1% zinc-silico-fluoride suspension was given on the thoroughly washed stone surface and preserved with 1% polymethyl methacrylate solution. The work was completed.

52. SUN TEMPLE COMPLEX, KONARAK, DISTRICT PURL— The second tier of *pidhas* alongwith the dancing figures between the first and second tier *pidhas* were subjected to chemical treatment for the removal of thick vegetational growth using 2% aqueous solution of ammonia mixed with 1% non-ionic detergent teepol. After cleaning and thorough washing of the surface, 1% suspension of zinc-silico-fluoride was sprayed and finally on the dried surface, 1-2% acrypol solution in toluene was applied as a preservative coat.

53. VIMLA TEMPLE IN LORD JAGANNATHA TEMPLE COMPLEX, PURI, DISTRICT PURI.— The deplastered surface of the Vimla temple was subjected to chemical treatment for the removal of tenacious lime plaster accretions by chemico-mechanical means using dilute acetic acid for softening the accretions. The chemically treated area was thoroughly washed to remove all the traces of acetic acid. The cleaned

surface was given a fungicidal coat of 1% zinc-silico-fluoride suspension and followed by application of a preservative coat of 2% acrypol solution in toluene on the dried surface.

54. JAGANNATHA TEMPLE, PURI, DISTRICT PURI.—The deplastered surface of the *vimana,* nineteen metres above the spring level, was taken up for the removal of remanent hard layer of lime plaster by chemico-mechanical process, using dilute acetic acid. After thorough washing the chemically cleaned area was given a fungicidal coat followed by application of 1-2% acrypol solution in toluene as preservative.

PONDICHERRY

55. THIRUKUNDANKULI MAHADEVA TEMPLE, MADAGADIPATTU.— Thick vegetational growth and lime wash deposits from the sculptures were removed with dilute ammonia-teepol mixture and acetic acid solutions respectively. The fungicidal treatment with 1% aqueous solution of sodium pentachlorophenate followed by 3% acrypol in toluene as preservative was carried out.

RAJASTHAN

56. IRON PILLAR OF JAWAHAR BURJ, BHARATPUR, DISTRICT BHARATPUR.—The iron pillar engraved with the names of Jat rulers and brave persons was subjected to chemical treatment. The thick deposits of rusted iron were removed with caustic soda solution and the green corrosion products from the top brass component were removed using alkaline sodium potassium tartarate solution. The last traces of chemicals were removed by thorough washing and finally preserved with 2% solution of polyvinyl acetate in toluene.

57. CHITTAURGARH FORT, CHITTAURGARH, DISTRICT CHITTAURGARH.— The micro-biological growth from the outer surface of Shringar Chauri temple was eradicated with dilute solution of ammonia and teepol mixture. The lime deposits wherever present were removed by treatment with dilute acetic acid solution. The work is in progress.

58. RANTHAMBHOR FORT, RANTHAMBORE, DISTRICT SAWAI MADHOPUR.— About eighty arms and weapons from the large collection kept in the rooms of Hammir palace of the fort were chemically treated for the removal of corrosion products and then preserved. The arms and weapons have components of various materials like iron, brass, wood, etc. The work is in progress.

TAMIL NADU

59. MATANGESVARA TEMPLE, KANCHIPURAM, DISTRICT CHENGAI ANNA.—The sculptural work was subjected to chemical treatment for the removal of vegetational growth and lime wash deposits using dilute solution of ammonia-teepol mixture and acetic acid respectively. The thoroughly washed area was given fungicidal treatment and preservative coat.

60. SHORE TEMPLE, MAHABALIPURAM, DISTRICT CHENGAI ANNA.— The chemical treatment work for the extraction of soluble salts by repeated paper pulp applications (extending upto 6 to 7 times) was continued on the remaining portion of the southern half of the *prakara* wall and Jalasayana Perumal shrine, when the surface was made free of soluble salts to the maximum possible extent, final washing with distilled water was carried out. The chemically treated area was given fungicidal treatment with 1% sodium pentachlorophenate solution and after drying preserved with 3% acrypol-P in toluene.

Besides this, filleting work, wherever observed necessary was also carried out as a measure to consolidate the surface.

The *vimana* of the main shrine and its walls facing east and south were first subjected to chemical treatment with dilute solution ammonia-teepol mixture for the removal of patches of vegetational growth. This was followed by paper pulp treatment and preservation as described above.

61. VAIKUNTHAPKRUMAL TEMPLE, KANCHIPURAM, DISTRICT CHENGAI ANNA. — Chemical treatment work was carried out for eradication of microbiological growth from the stone surface using dilute solution of ammonia and teepol mixture. Several black marks of numbering over the surface were also cleaned by chemico-mechanical means. The cleaned and dried surface was given fungicidal treatment by spraying 1% solution of sodium pentachlorophenate and followed by application of 3% solution of acrypol-P in toluene. The beautiful stucco figures and designs on the upper part of the *vimana* were preserved with 5% solution of polyvinyl acetate in toluene.

62. SIKKA GIRISVARA TEMPLE, KUDUMIAMALAI, DISTCICT1\!DUKKOTTAT,.._- Deposits of red ochre, lime wash, and black patches from the stone surface of Nootrukal *mandapa* were removed by treatment with oxalic and, glacial acetic acid, ammonia-teepol solution respectively. The thick layer of soot and greasy deposit from the stone surface *of dvarapalakas* were also removed. The entire cleaned area was finally preserved.

63. GINGEE FORT COMPLEX, GINGEE, DISTRICT SOUTH ARCOT.— Vegetation growth, dust and dirt, etc. from the stucco figures and designs of Sri Venkataramana temple were removed by dilute ammonia-teepol mixture. The lime wash deposits from the stone sculptures were removed using dilute acetic acid. The chemically treated areas were thoroughly washed and given fungicidal treatment with 1% solution or" sodium pentachlorophenate. Finally, a preservative coat was applied on the dried surface.

64. BRIHADISVARA TEMPLE., THANJAVUR, DISTRICT THANJAVUR,— The Nayaka paintings in the Amman shrine having accretionary deposits of superficial dust, dirt, cobwebs alongwith soot and greasy matter due to burning of camphor were subjected to chemical treatment using various organic solvents vi:., triethanolamine, butyl lactate, diacetone alcohol, etc. During the treatment, turpentine oil was used as restrainer. Consolidation of bulgings, filling up of cracks and filleting of broken edges was also attended. The chemically cleaned areas were preserved.

The surface area having inscriptions around the main shrine was subjected to chemical treatment for the removal of micro-biological growth, lime wash, red ochre, etc. This surface was thoroughly washed, given fungicidal treatment and application of a preservative coat.

66. BRIHADISVARA TEMPLE, GANGAIKONDACHOLAPURAM, DISTRICT TRICHY.— The moss and lichen growth from the stone sculptures were removed using dilute solution of ammonia-teepol mixture. The red ochre and lime wash marks were cleaned with dilute oxalic acid and acetic acid. The chemically cleaned and washed surface was given fungicidal treatment and preservative coat.

UTTAR PRADESH

67. ITMAD-UD-DAULA, AGRA, DISTRICT AGRA.—Chemical treatment work for removal of din, dust, smoke and other superficial accretions from the painted surface in northern verandah and north-west corner was continued using different organic solvents like cellosolve, benzene, methylate spirit, butyl lactate, triethanolamine, etc. The cleaned surface was given a preservative coat of 1 % polyvinyl acetate in toluene (pl. XCV).

The marble surface in this area was also subjected to chemical treatment.

68. DIWAN-I-KHAS, FATEHPUR SIKRI, AGRA, DISTRICT AGRA.— Chemical treatment was carried out for removal of thick deposits of dust, dirt, moss and lichen from the walls and corner *burjis* using dilute solution of ammonia-teepol mixture with hydrogen peroxide. The cleaned surface was thoroughly washed and applied a preservative coat of 2% polyvinyl acetate in toluene.

69. SHEIKH SALIM CHISTI DARGAH, FATEHPUR SIKRI, AGRA, DISTRICT AGRA.—The marble surface of the tomb of Sheikh Salim Chisti and railing around it were covered with thick layers of dust, dirt and greasy matter. These accretions were removed by chemical treatment using ammonia, teepol and hydrogen peroxide mixture. The treated surface was finally washed with distilled water.

The painted surface in the tomb, which was covered with smoke, dust, greasy matter was subjected to chemical treatment using mixture of suitable organic solvents. The work was completed.

70. ASOKAN PILLAR, ALLAHABAD, DISTRICT ALLAHABAD.— The salt effected areas were given the paper pulp treatment and after repeated applications of paper pulp treatment, the surface was thoroughly washed and given fungicidal treatment as well as preservative coat.

71. SISTER OF PRINCE KHUSRO TOMB, ALLAHABAD, DISTRICT ALLAHABAD.— The thick deposits of moss, lichen, dust and dirt on the outer surface of this tomb giving ugly appearance was removed by using mixture of ammonia-teepol in aqueous medium. After chemical cleaning thorough washing, the fungicidal treatment with 1% zinc-silico-fluoride was given. Finally on the dried surface, 2-3% polyvinyl acetate in toluene was applied as a preservative coat. The work is in progress.

72. ASAFI MOSQUE, LUCKNOW, DISTRICT LUCKNOW.— Chemical treatment work was carried out on the front facade and side walls of the monument for removal of lime wash coats by chemico-mechanical method using dilute solution of acetic acid. The treated surface was thoroughly washed with very dilute solution of teepol. The thoroughly cleaned surface was given the fungicidal and preservative coats.

73. SADAT ALI TOMB, LUCKNOW, DISTRICT LUCKNOW.— The exterior surface of the tomb covered with moss, lichen, dust, dirt and other accretions was subjected to chemical treatment with dilute solution of ammonia-teepol mixture. After thorough washing, the fungicidal treatment was given and finally on the dried surface, preservative coat of 3% polyvinyl acetate in toluene was applied. The work is in progress.

74. GOVIND DEO 'S TEMPLE, VRINDAVAN, DISTRICT MATHURA.— The chemical treatment work on the interior surface of the central hall and inner part of the *rangamandapa* was continued for the removal of dust, dirt, soot and bat's excreta. The cleaned surface was thoroughly washed and given preservative coat on the dried surface.

75. VOTIVE STUPA, SARNATH, DISTRICT VARANASI.— The chemical treatment work was taken up on the votive stupas on the west and north side of Asoka's column. These brick and stone structures were covered with thick layers of deep rooted microphytes and were removed by treatment with dilute solution of ammonia. It was followed by general cleaning with dilute solution of teepol. The cleaned surface was thoroughly washed and given funigicidal treatment as well as preservative coat on the dried surface.

TREATMENT OF EXCAVATED OBJECTS AND MUSEUM EXHIBITS[1]

1. Three oil paintings on canvas and seven paintings on paper in Hazarduari palace museum, Murshidalead were chemically treated and preserved. The wooden frames were painted with bronze golden powder in polyvinyl acetate solution in sulphur free toluene. Besides, a number of other antiquities, *viz.,* forty-six swords, five spears, five axes, twenty guns, one *howda,* two big sized palanquins, one silver object, one wooden object, four elephants, one agniban were chemically cleaned and preserved.

2. Seventy-five copper coins received from the Institute of Archaeology of the Survey were subjected to chemical treatment and preservation in the Delhi Zonal laboratory.

3. Three old photo albums having a few hand drawn sketches dating back to 1830 were received from Infantry School Library, Mhow, by the Indore Regional Laboratory. These were subjected to fumigation, general dusting; tom prints/sketches were repaired.

4. Twelve copper coins out of thirty-four coins received from the Bhopal Circle of the Survey were chemically treated and preserved.

5. Fourteen granite sculptures of assorted size and two wooden figures displayed in the Space Museum of SHAR Centre, Department of Space, Sriharikota Range were chemically treated for removal of lime wash, muddy deposits, patches of coal-tar and other accretions and were preserved by the Madras Zonal Laboratory.

6. The library books and other wooden objects in the Vadodara Circle of the Survey were subjected to fumigation using thymol, paradichlorobenzene and finally sprayed with Aldrex-30 for eradication of fungal and insect activity. The work was carried out by the Vadodara Zonal Laboratory.

7. In the Science Laboratory of the Survey, Dehradun, antiquities from various sources were received for chemical treatment and preservation.

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[1]Information from: 1-8- Chemical Branch of the Survey.

(i) Sixty-five pages, badly effected by the insect activity and neglect, were cleaned, fumigated and encapsulated in butter paper.

(ii) Two manuscripts *Tafsira Mawabib Alaih,* Commentary on Quran by Mulla Hussain Waiz Basif belonging to Archaeological Museum, Bijapur, which were sent to USA for exhibition were received by this laboratory after return to the country. These were treated for removal of water marks and other stains, fumigated in thymol chamber and p-dichlorobenzene, the leather wrapper of one manuscript (Accession No. 913) was also mended and the damaged corners were restored and colour matched (pl. XCVI).

(iii) Four miniature paintings received from the Taj Museum, Agra were chemically treated, repaired and fumigated.

(iv) One old book entitled *Sanchi,* received from the Delhi Circle of the Survey was chemically cleaned, fumigated and the bound cover was repaired.

8. An earthen pot found in the premises of the Burmese temple, Sarnath, was opened at the site and a number of extremely valuable antiquities were scientifically recovered and cleaned.

RESEARCH AND ANALYSIS[1]

1. AIR POLLUTION STUDY IN RELATION TO AGRA MONUMENTS.— In order to keep a watch on the ambient air quality of Agra and to study the effect of various gaseous pollutants and particulate matter on the monuments of Agra, the Air Monitoring Laboratory of the Survey at Agra continued to monitor the level of sulphur dioxide, dust fall, suspended particulate matter and other meteorological parameters was continued.

The measurement of sulphur dioxide level at Agra was continued and in the first half of the year 1991, the level of average sulphur dioxide was recorded to be above 30 ug/m^3 which was higher than the prescribed limit for sensitive zones.

The measurement of dust fall at three stations *viz.,* the Taj Mahal, Red Rort and Sikandara at Agra was continued. At Sikandara, the dust fall during the year 1991-92 was generally recorded to be much higher than at the Taj Mahal and Red Fort, Agra. The dust samples thus collected have been analyzed qualitatively and quantitatively for the presence of deleterious salts and acidic radicals and was found to be contaminated. The studies were also carried out to evaluate their impact on the stone surface in the long term.

The measurement of sulphation rate by lead candle method was carried out at two monitoring stations *viz.,* the Taj Mahal and Sikandara. The pollution rate in terms of sulphation rate was generally less during the period August, 1991 to January, 1992 in comparison to other months. The maximum sulphate rate was measured in April, 1991 at both the stations the values being 1-14 mg 100 cm day and 1.24 mg 100 cm day at the Taj Mahal and Sikandara respectively.

[1]Information from : 1 and 8, Chemical Branch of the Survey; and 2-7, National Research Laboratory for Conservation of Cultural Property, Lucknow.

The fine dust particles having least influence of gravitational force can remain airborne for a longer period. These particles are removed from the air by impaction. This parameter is important as SPM is responsible for blackening/yellowing of the surface due to its sticking power on the surface and due to the presence of organic/inorganic acids which is harmful to the stones in the long term if not removed periodically by chemical treatment. The SPM measurement carried at the Taj Mahal monitoring station showed quite higher values in April, 1991 and except the rainy season, the level of SPM in the ambient air of Agra has generally been monitored above the prescribed limit of 100 ug/m^3 for sensitive zones.

Rain water is the true representative of the pollutants present in the air due to its wash out effect. The analysis of rain water carried out during the year 1991-92 indicated the presence of appreciable amount of soluble salts and was tested to be acidic in nature and the pH varied from 6.1 to 6.99 during the period under review.

2. BIO-DETERIORATION STUDIES OF STONE MONUMENTS AND HISTORIC BUILDINGS.— Algal samples collected from different monuments in south India were cultivated. Biocidal testing to control the growth of algae was done on selected algae. Experiments were also in progress to see the effect of biocides on stone samples.

3. STUDIES ON MORTARS AND PLASTERS IN RELATION TO HISTORIC BUILDINGS.— Plaster blocks were prepared with lentil, morang and lime in different ratios. Study of physical properties like compressive strength, water absorption properties and artificial weathering on the sample blocks were continued.

4. TECHNO-HISTORICAL STUDIES OF ANCIENT COINS.— This involved investigating materials of coinage and its methods of fabrication and relationship with the socio-economic and political history of Kausambi. About two hundred coins were selected for the study.

5. CONSERVATION OF BUDDHIST MONASTERIES IN LADAKH.— A team of scientists were deputed to Ladakh to survey the condition of art-objects present in monasteries. Seven monasteries were visited and a survey report prepared.

6. CONSERVATION OF WALL PAINTINGS.— The conservation work of wall paintings at St. Monica Church, Goa and Orchha, Madhya Pradesh was in progress.

7. CONSERVATION OF THANKAS AT TAWANG MONASTERIES, ARUNACHAL PRADESH.—Work pertaining to conservation of *thangkas* was continued during 1991-92. Twenty-five *thangkas* are under treatment.

8. ANALYTICAL STUDIES.—Analytical studies were carried out at the Science Laboratory of the Survey, Dehradun:

(i) Two stone samples from Angkor Vat temple, were analyzed for chemical composition.

(ii) Two samples from Nila Gumbad, Hazipur, were analyzed to ascertain their chemical composition.

(iii) Three plaster samples received from the Directorate were chemically analyzed.

(iv) Analysis was carried out of minor fractions of some metallic foils and the clays from the earthen pots found at Sarnath.

(v) Three pottery samples from Jakhera excavations received through Aligarh Muslim University, Aligarh were chemically analyzed.

(vi) As a part of the research project, the efficacy of different salts as tree killer was studied. The salts studied are copper sulphate, sodium chloride and sodium nitrate. In addition, the efficacy of Asafoetida was also analyzed.

(vii) Studies were also carried out to use plaster of Paris for joining broken pieces of marble and then converting the joining part of high strength calcium carbonate. However, the results did not correspond to anticipated improvement.

(viii) Metallographic studies were carried out on iron and brass samples of a life-size sculpture.

XII. ARCHAEOLOGICAL GARDEN[1]

ANDHRA PRADESH

1. HILLTOP GARDEN, NAGARJUNAKONDA, DISTRICT GUNTUR.— In order to augment water supply, the work of boring well and laying water pipes were completed.

2. GOLCONDA FORT, GOLCONDA, DISTRICT HYDERABAD.— The installation of water-pipes and bore-well was completed.

3. RAMAPPA TEMPLE, PALAMPET, DISTRICT WARANGAL.— The work of landscaping was completed.

JAMMU AND KASHMIR

4. RAMNAGAR FORT, RAMNAGAR, DISTRICT UDHAMPUR.—The work of laying garden was initiated.

KARNATAKA

5. MONUMENTS AT AIHOLE, DISTRICT BIJAPUR. — Irrigation water arrangement was re-oriented by laying new distributory pipe-lines.

6. DURGA TEMPLE, AMBEGERGUDI AIHOLE, DISTRICT BIJAPUR.— Irrigation water arrangement was re-oriented by laying out new distribution pipe-lines from the new reservoir.

7. ASAR MAHAL, BIJAPUR, DISTRICT BIJPUR.—The work of boring well and laying water pipes was completed.

8. ALI RAHZA, BIJAPUR, DISTRICT BIJAPUR.— Water-pipes were laid and the work of boring well was completed.

9. LAKSHMI-NARAYAN TEMPLE, HOSAHOLALU, DISTRICT MANDYA.— The work of landscaping and development of garden was completed.

RAJASTHAN

10. SIVA TEMPI-E, KANSUWA, DISTRICT KOTA.—The work of development of garden was taken up.

ORISSA

11. KHANDAGIRI AND UDAYAGIRI CAVES, BHUBANESWAR, DISTRICT PURL—Development of garden was taken up.

TAMIL NADU

12. VELLORE FORT, VELLORE, DISTRICT NORTH ARCOT AMBEDKAR.—The work of landscaping and development of garden was completed.

UTTAR PRADESH

13. MACCHI BHAWAN COMPLEX, AGRA FORT, AGRA, DISTRICT AGRA.—The work of renovation and laying out garden was completed.

14. ROMAN CATHOLIC CEMETERY, KEYDGUNJ, ALLAHABAD, DISTRICT ALLAHABAD.— Steps were taken up to develop the garden by preparing landscape plan.

XIII. PUBLICATIONS

PUBLICATIONS OF THE SURVEY

1. INDIAN ARCHAEOLOGY - A REVIEW.—The issue for the year 1986-87 was brought out and the issue for the year 1987-88 was sent to press.

2. ARCHITECTURAL SURVEY SERIES.— Number 6, *Temples of Gangas of Karnataka* by I.K. Sarma was in advanced stage of printing.

3. EPIGRAPHIA INDICA.— Volume XLII was in advanced stage of printing.

4. SOUTH INDIAN INSCRIPTIONS.— Volume I and II were reprinted.

5. ANNUAL REPORT ON INDIAN EPIGRAPHY.— The issue for the year 1979-80 was in advanced stage of printing.

OTHER PUBLICATIONS

ANDHRA PRADESH.— The Department of Archaeology and Museums, Government of Andhra Pradesh, brought out the following publications: *Three grants of Prithivimula Raja from Kondavedu; Recent Acquisition of Roman gold Coins by State Museum, Hyderabad; Nalgonda District Inscriptions,* Vol. I; *A Hand book on Nalgonda District Museum;* and *Reddi Sanchika* (reprinted).



A



B

Gopalapatnam: exposed structures. *See p. 3*



A

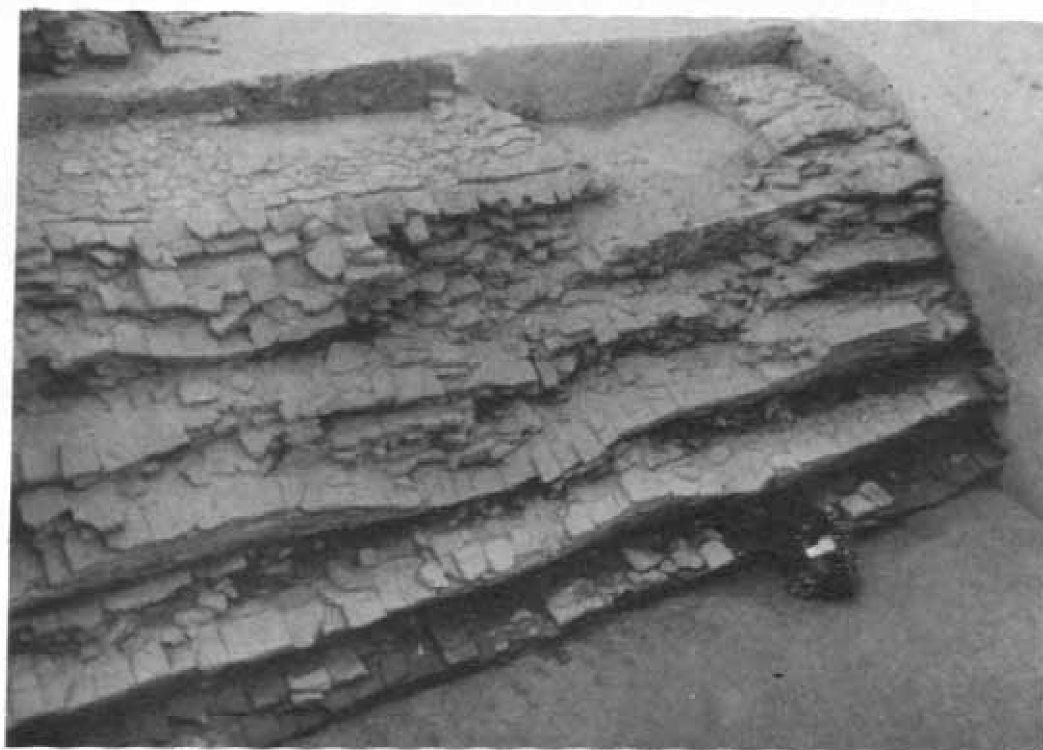


B

Gopalapatnam: A, *votive stupa;* B, *pillar in situ. See p. 3*

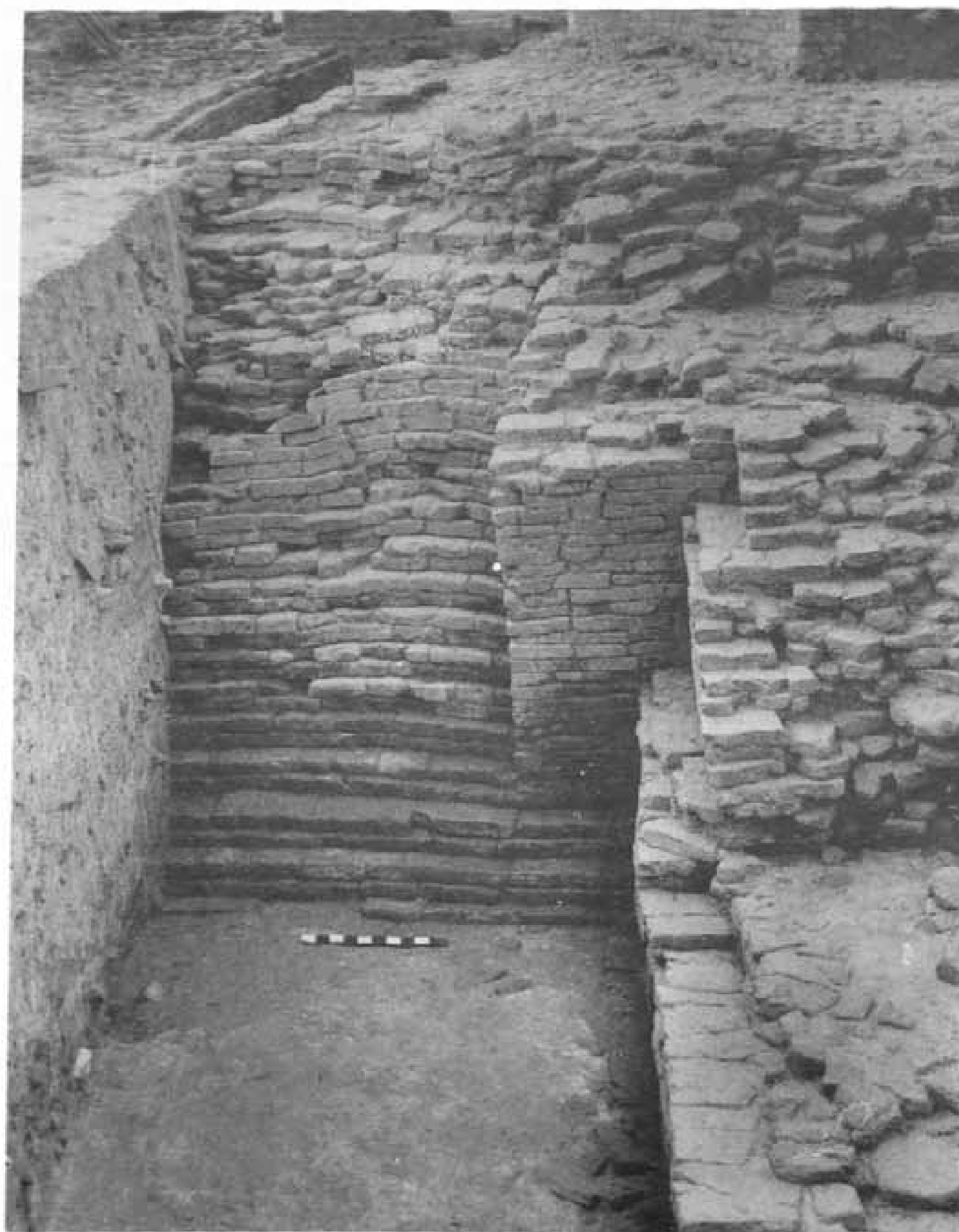


A

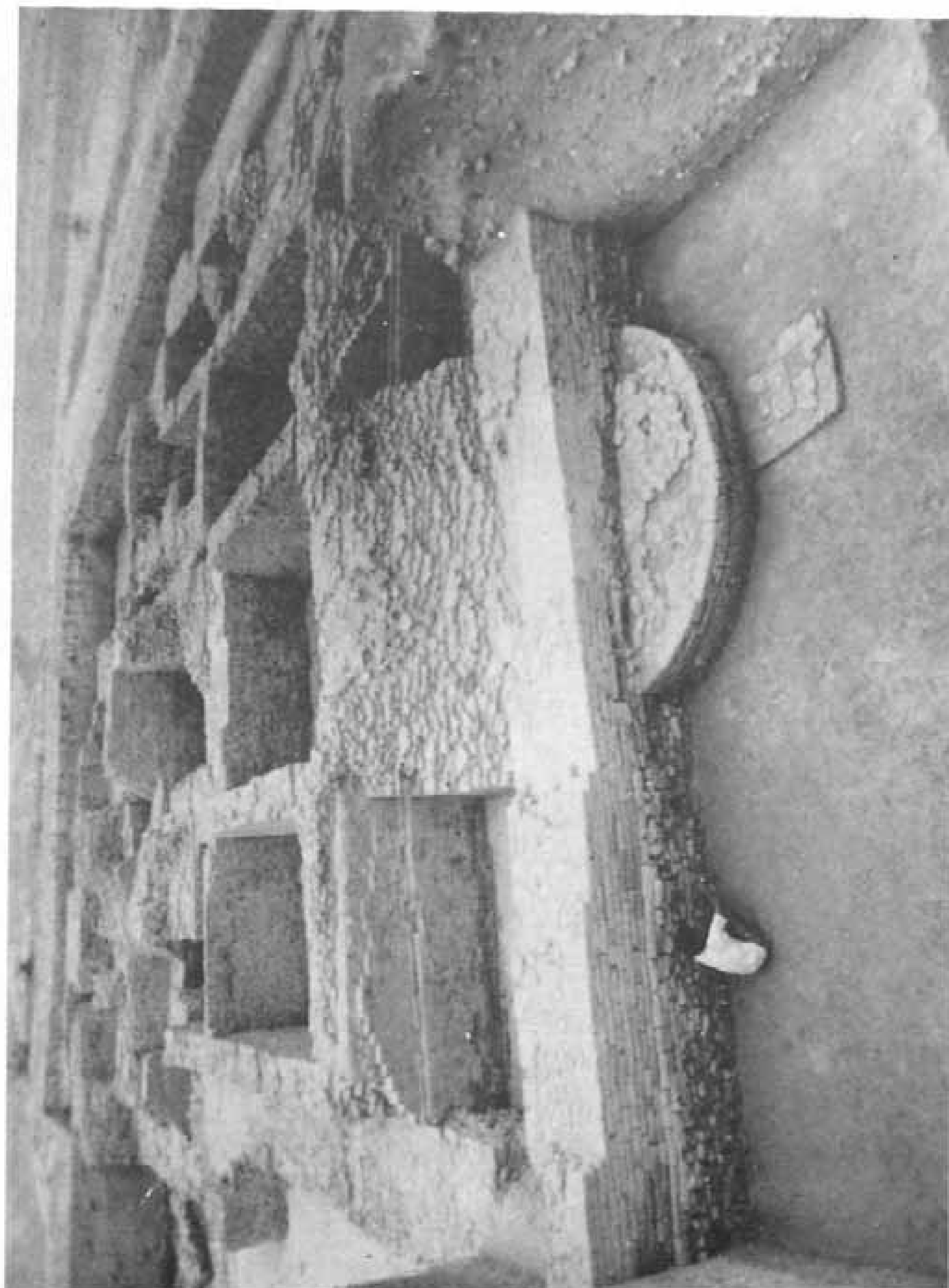


B

Kolhua: exposed structures, south of Asokan pillar. See p. 5



Kolhua: western part of the tank. *See p. 5*



Kolhua: exposed structures. *See p. 6*

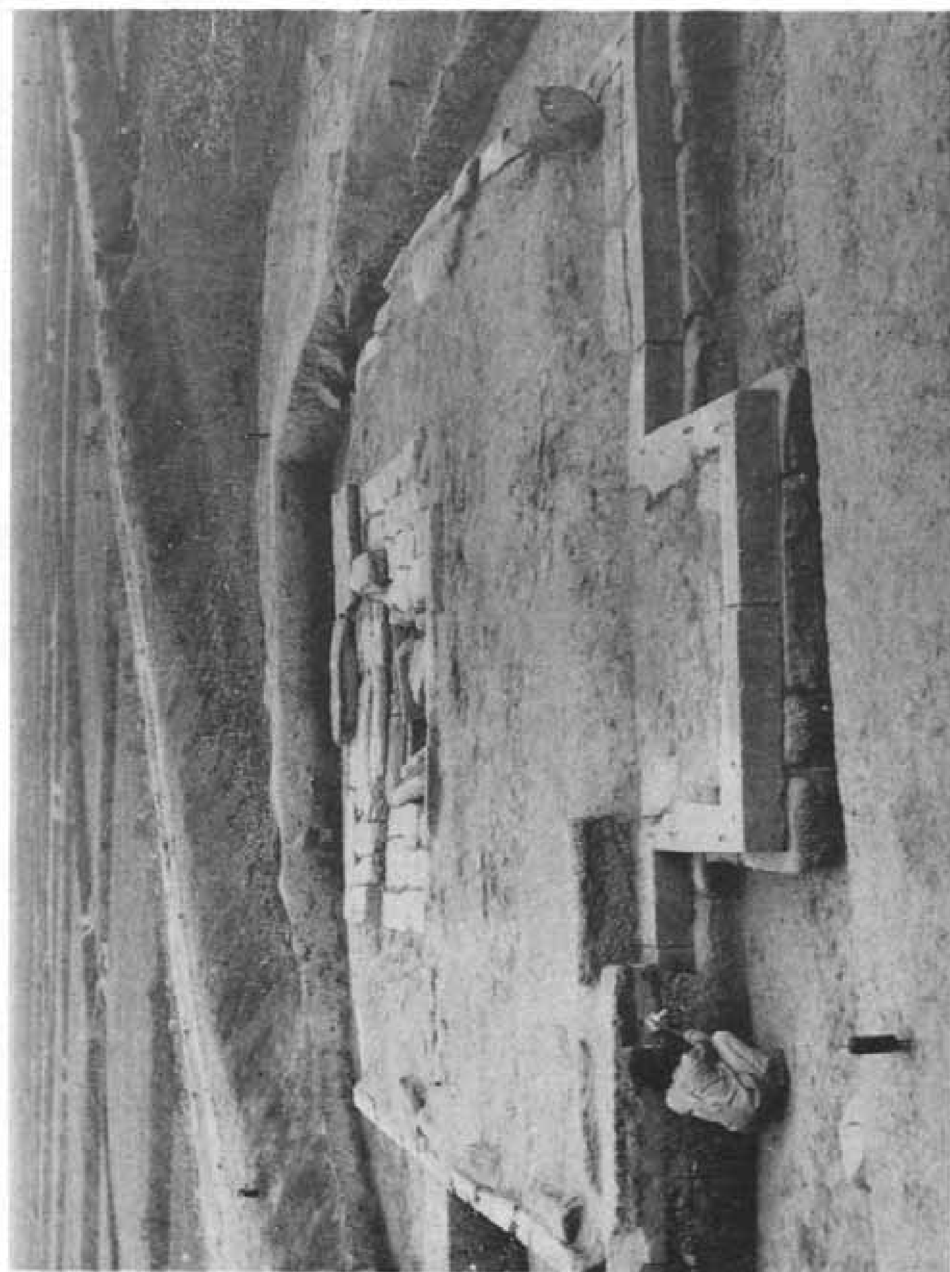


A



B

Maner: terracotta objects; A, *Period I and* B, *Period II.* *See p. 7*



Tchagarh: exposed structure of temple. See p. 8



C



D



A

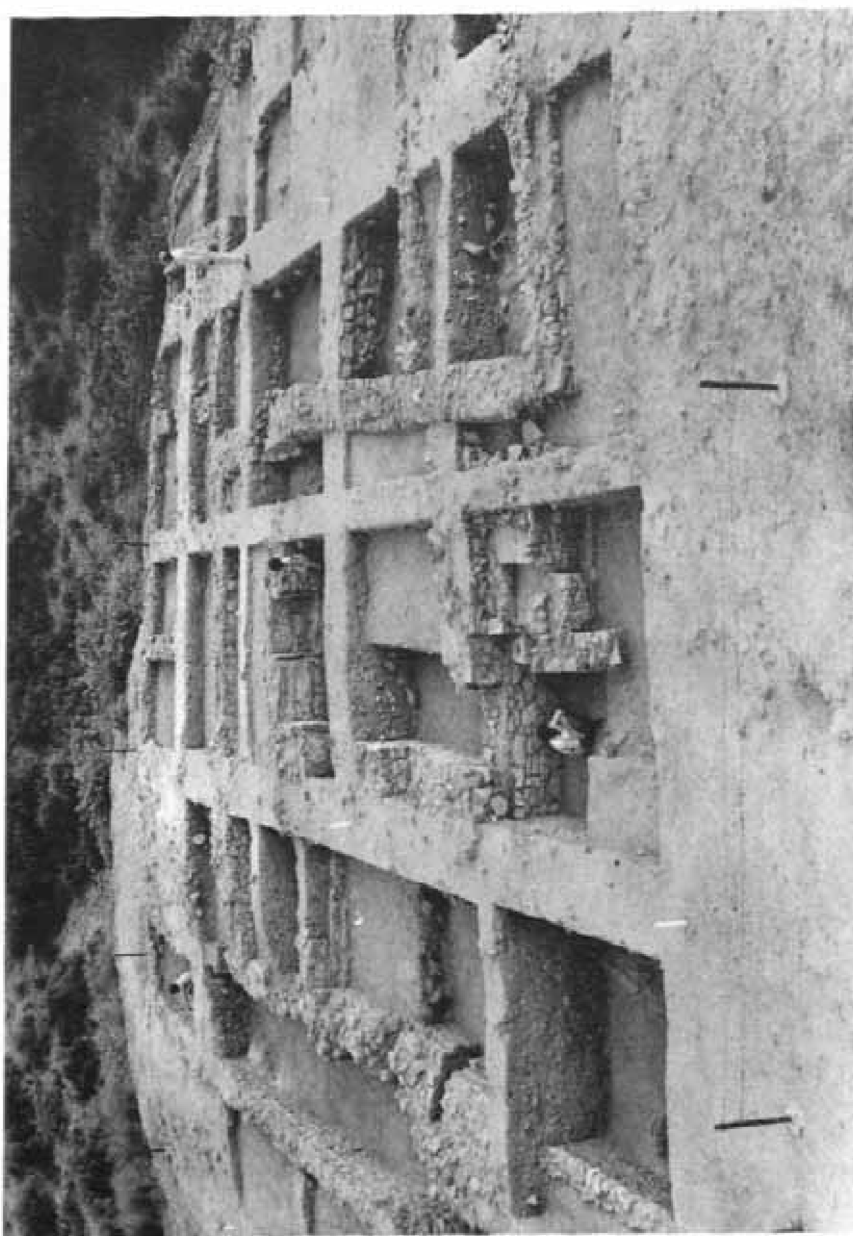


B

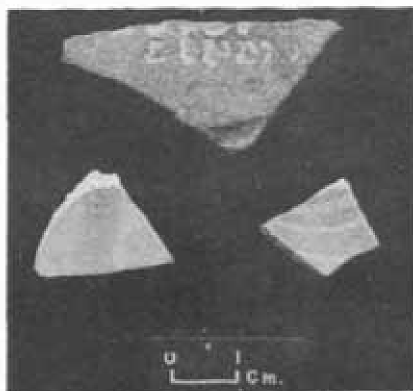
Ichagarh: architectural members, See pp. 8-9



Lal Kot: Citadel mound. *See p. 9*



Lal Kot: view of the exposed trenches. *See p. 9*



A



C



B



D

Lal Kot: A, *inscribed potsherd;* B, *stone Varaha;* C, *glazed dish;*
D, *terracotta human figurine,See pp. 12, 14-15*



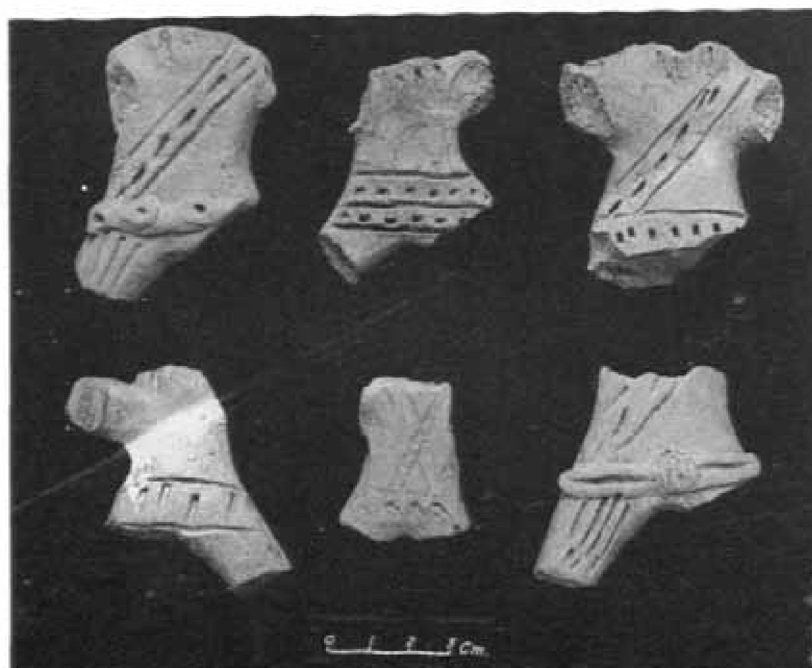
Lal Kot: exposed structures, Phase II of Period I. *See p. 14*



Lal Kot : staircase of Phase II of Period II. *See p. 14*



A



B

Lal Kot: terracotta human figurines. See p. 15



A

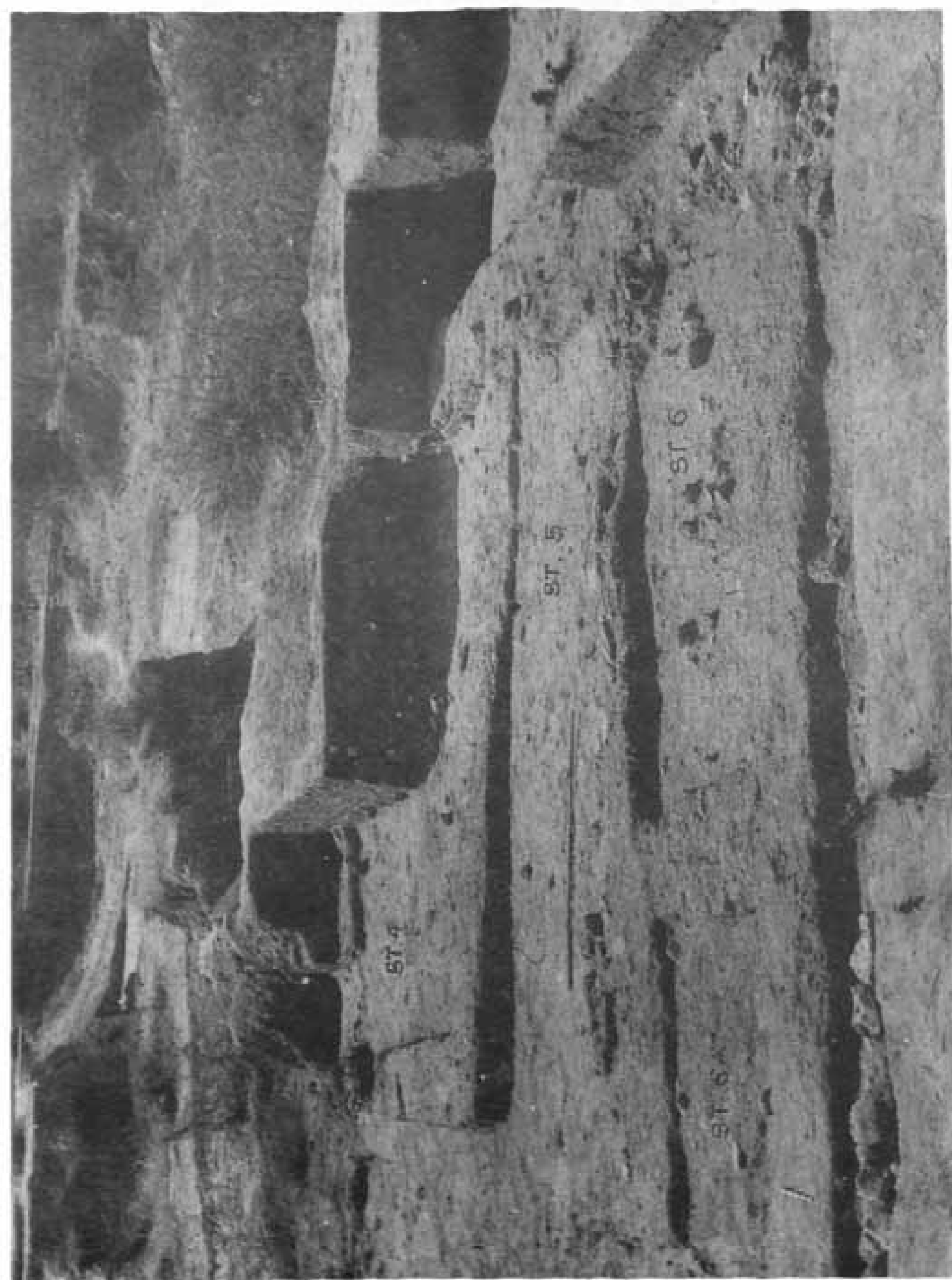


B



C

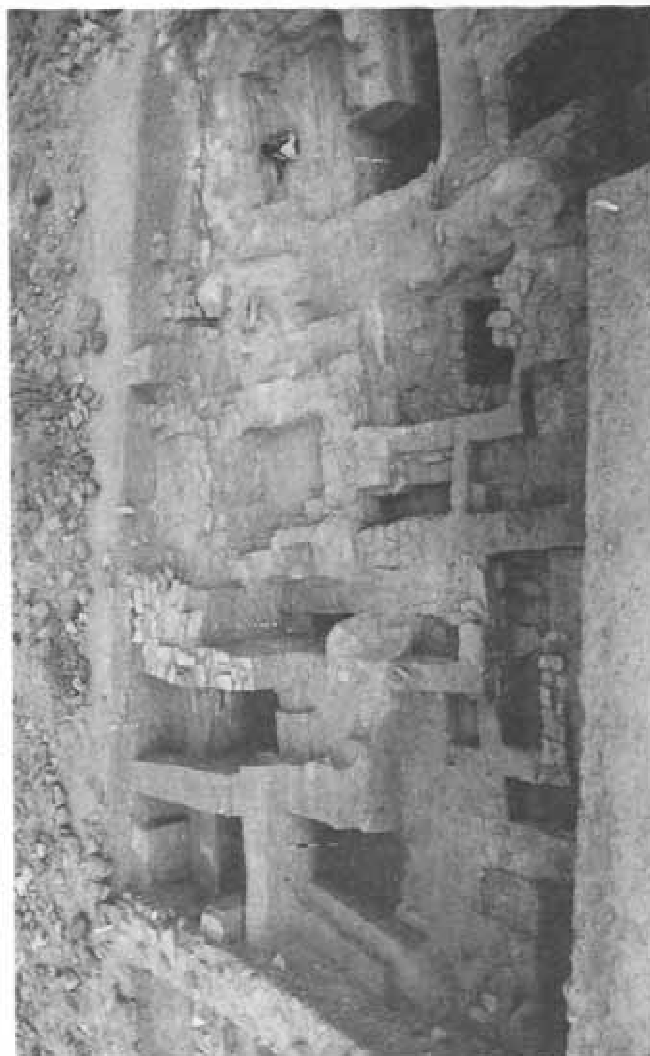
Lal Kot: A, *animal figurine;* B, *lamp stand; and* C, *finial, all terracotta. See p. 15*



Padri: structures, Period I. *See p. 21*



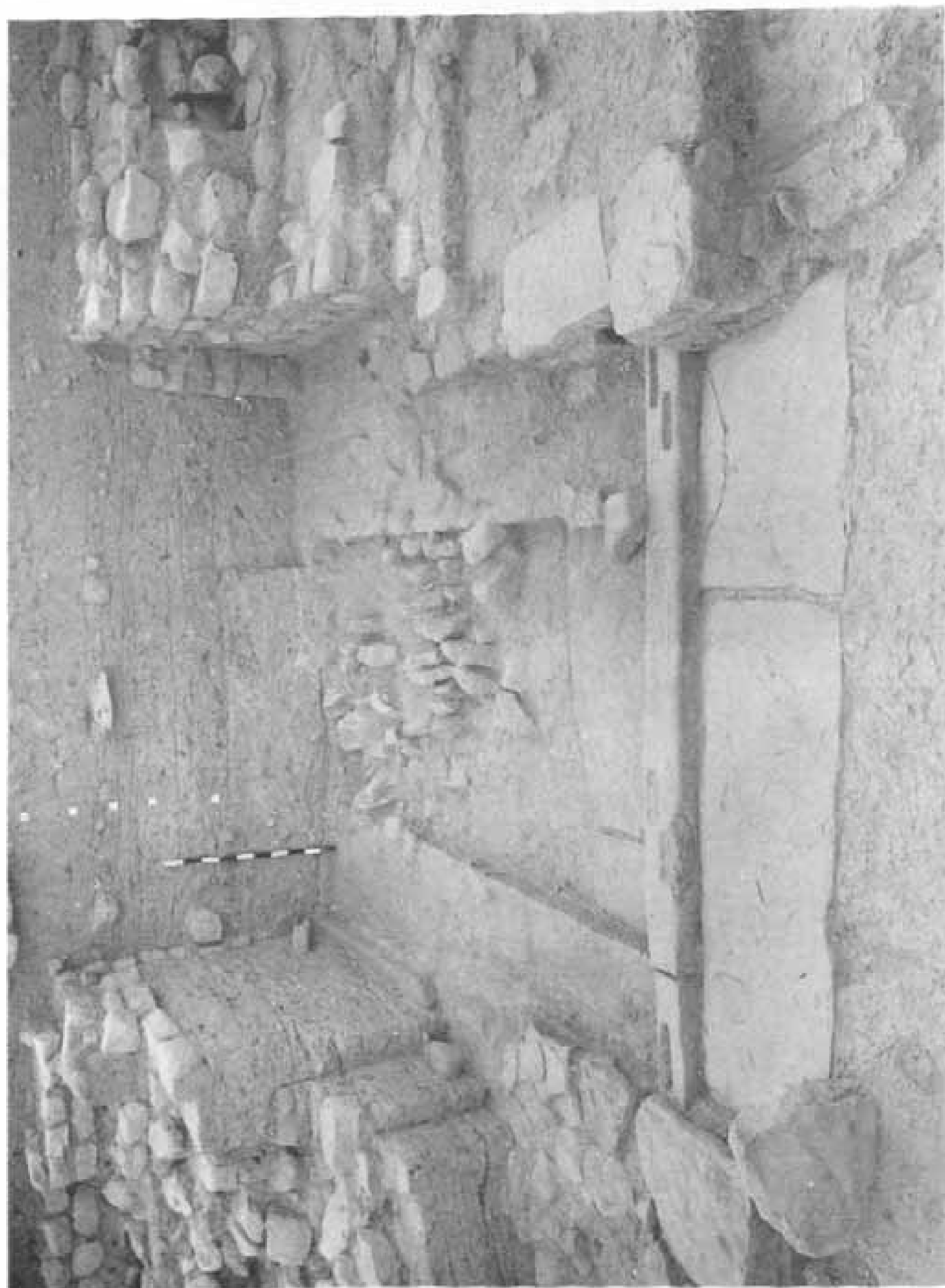
Dholavira : section across rain-gully showing stages of fortification wall. *See p. 26*



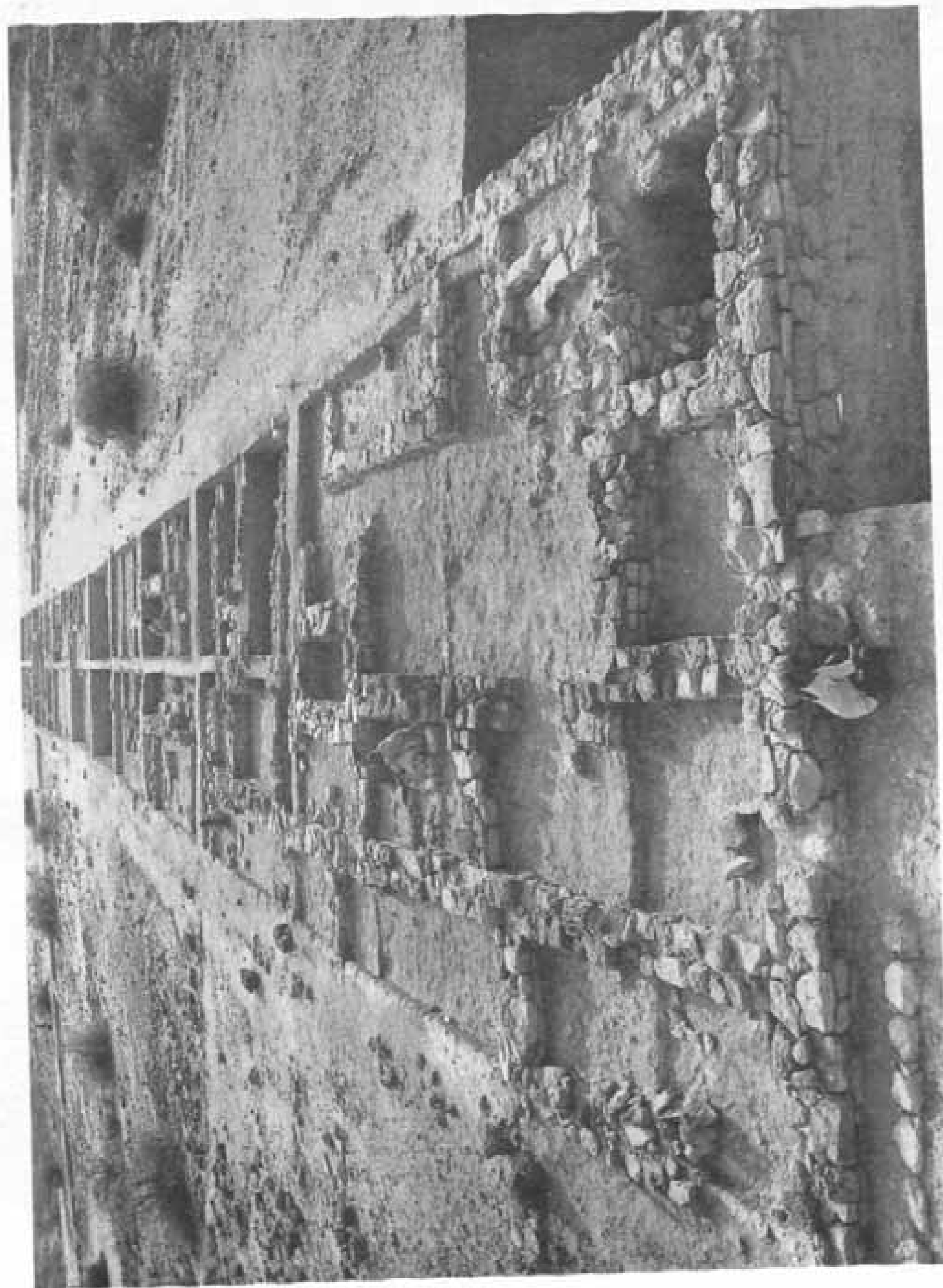
Dholavira: structures of stage II and III. *See p. 28*



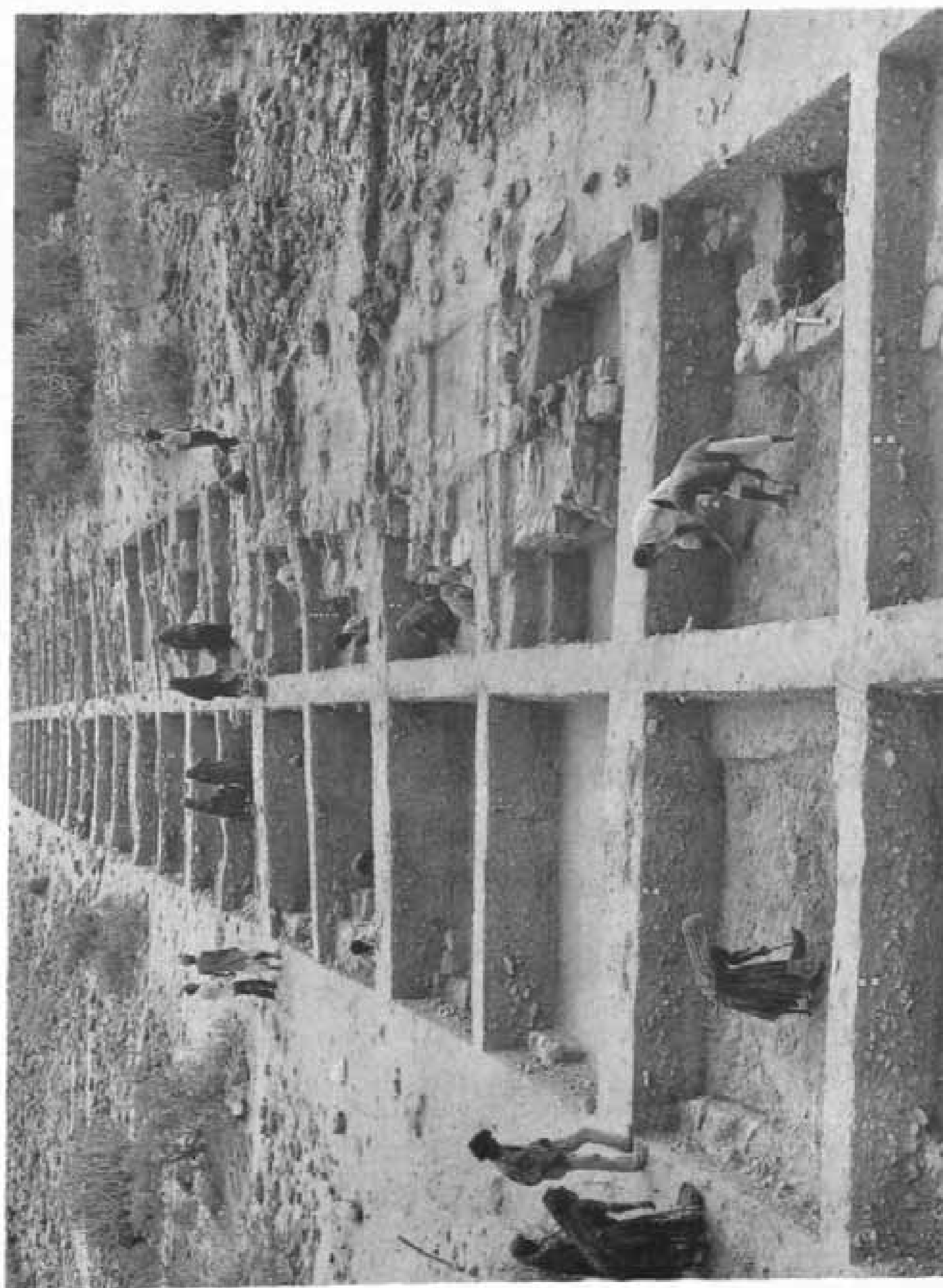
Dholavira: water-chute in the eastern castle wall. *See p. 32*



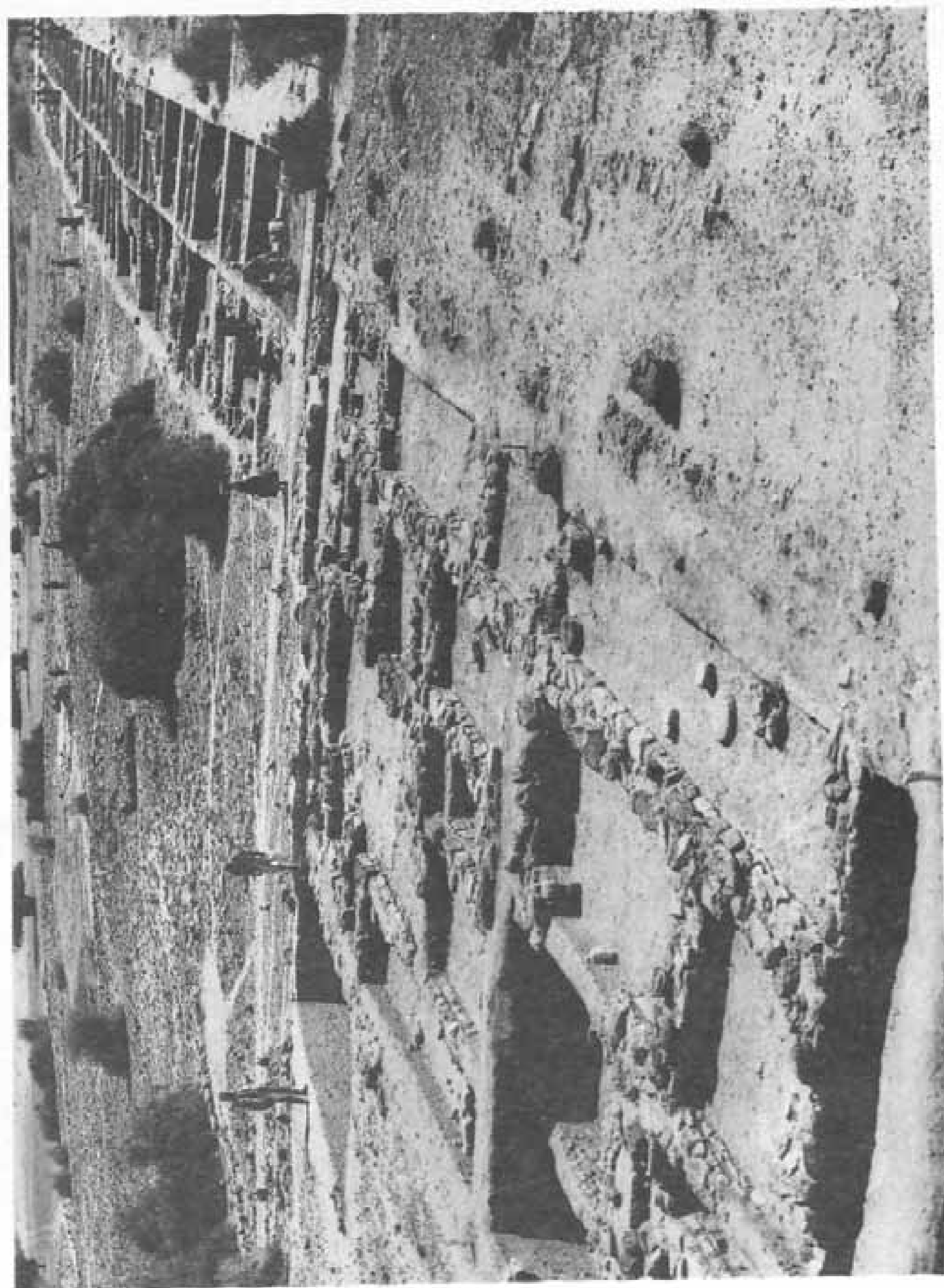
Dholavira: east gate of Middle Town. *See p. 32*



Dholavira : exposed structures across the Middle Town. *See p. 32*



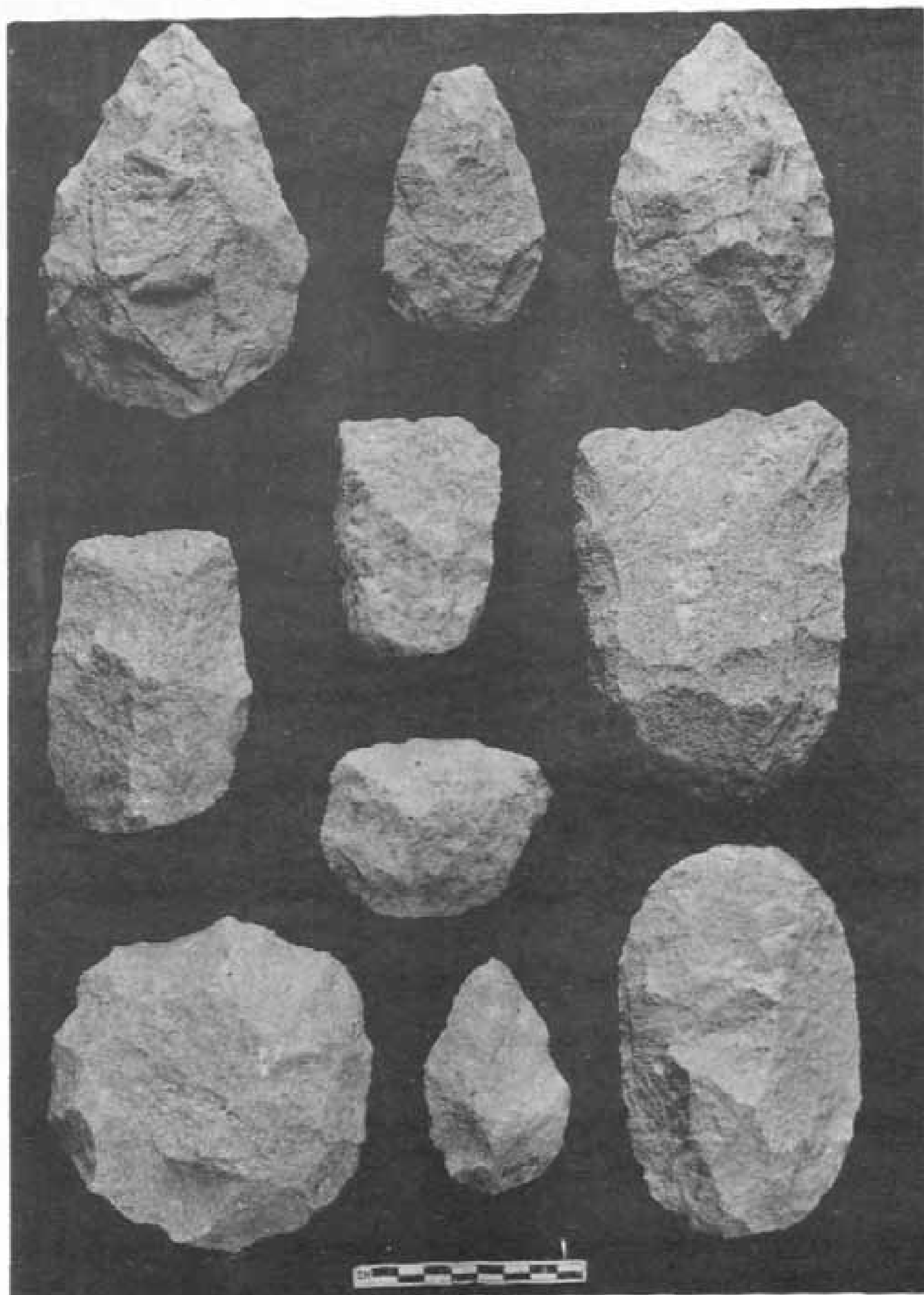
Dholavira: arterial street running through squares on the left of trench. *See p. 32*



Dholavira: exposed trench across lower town. *See p. 32*



Arangpur: Implementiferous deposit. *See p. 35*



Arangpur : Late Acheulian artefacts. See p. 36



Hampi: area north-east of Saraswati temple, before excavation. *See p. 39*



Hampi: area north-east of STR-I, after excavation. *See p. 39*



A



B

Hampi: A, *platform on the third landing and* B, *yali balustrade, STR-I.* *See p. 40*

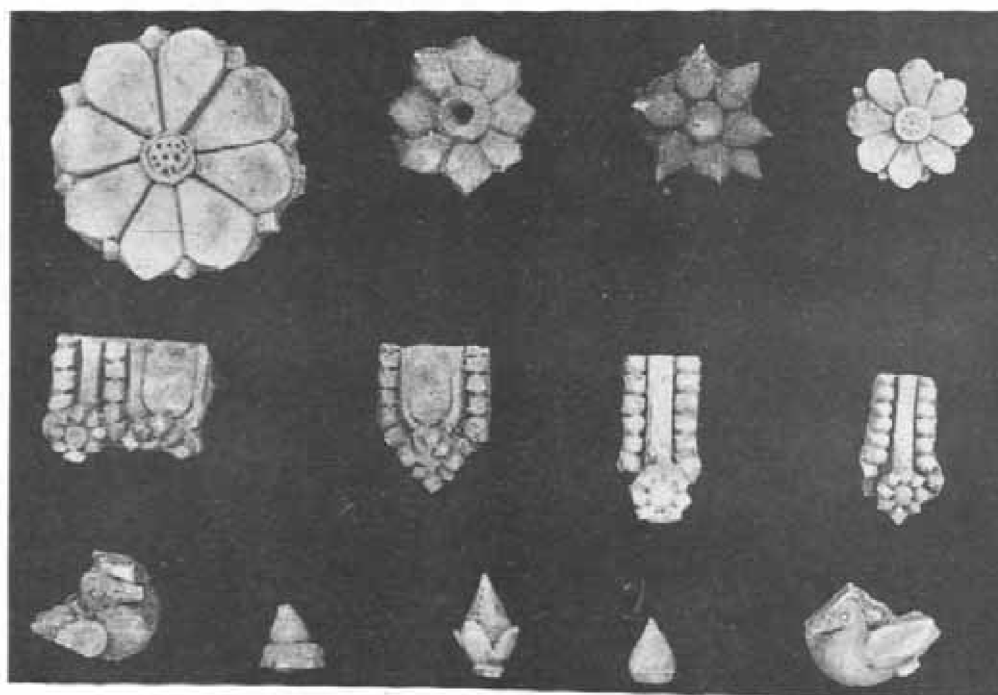


A

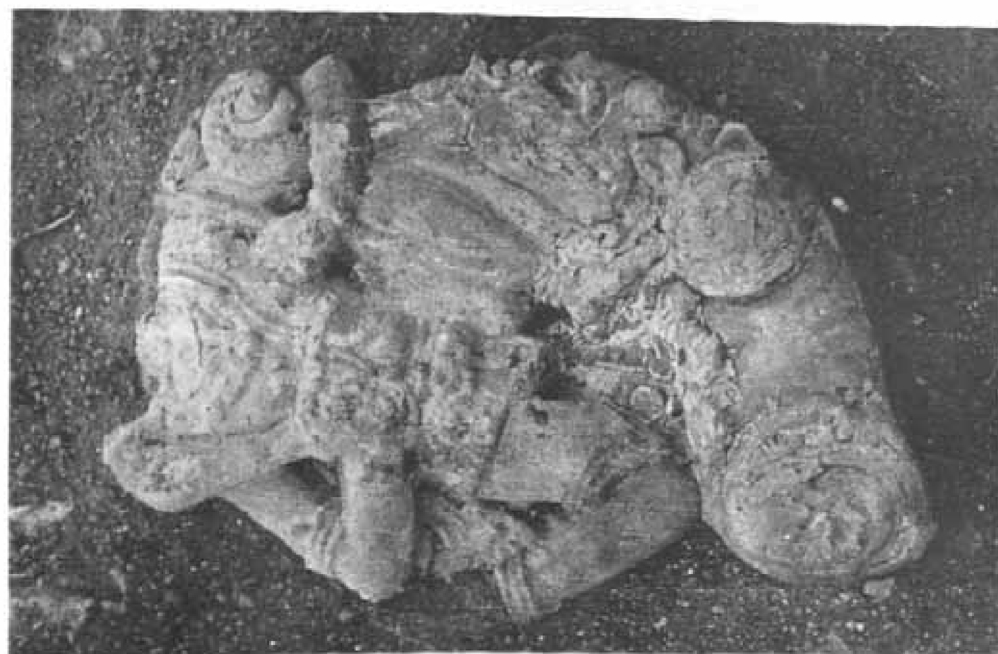


B

Hampi: Structure II, before and after excavation. *See p. 40*



A



B

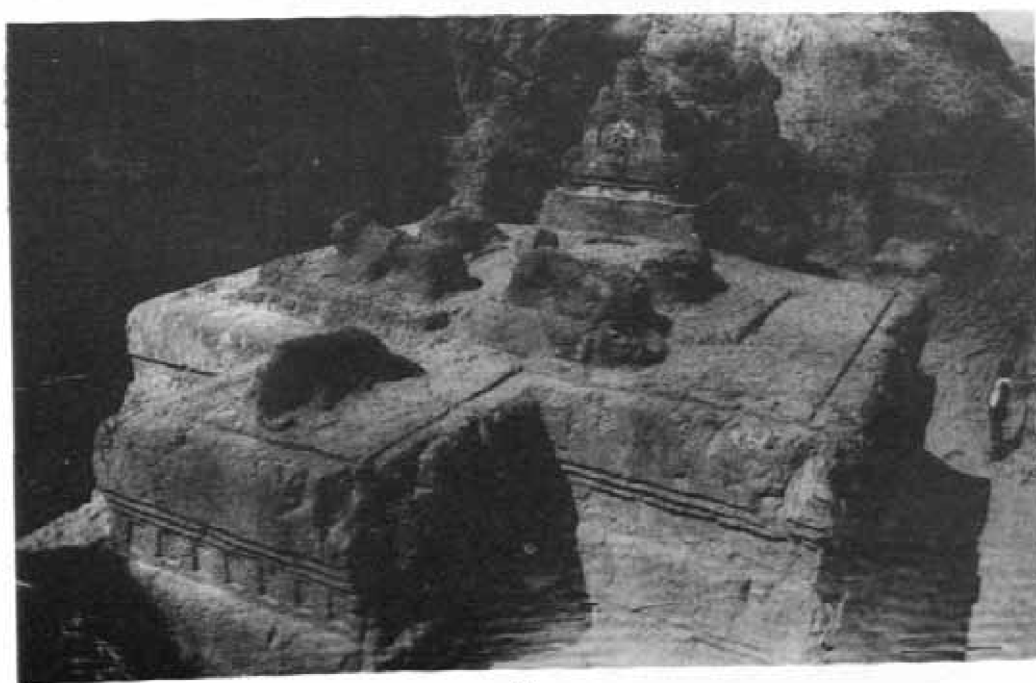
Hampi: A, *decorative motifs;* B, *gandharvas on makara.* *See p. 41*



Hasargundgi: yaksha, See p. 45

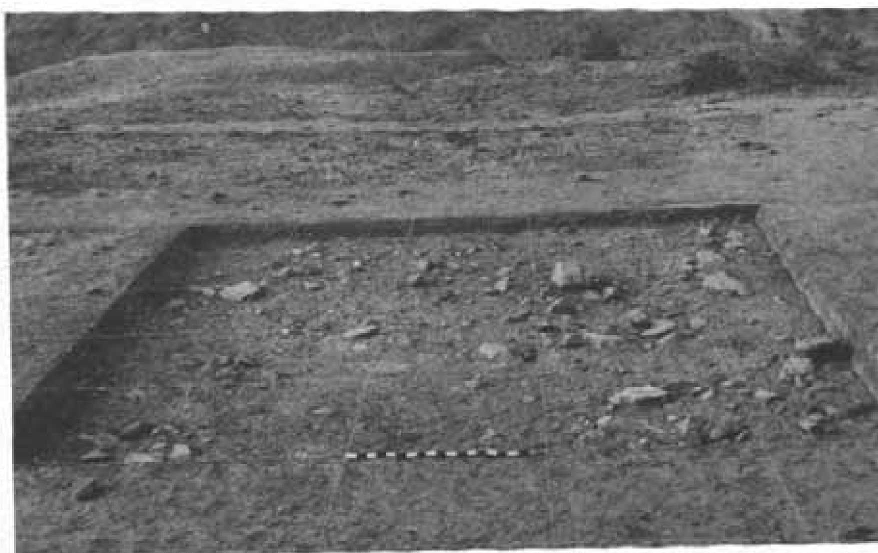


A



B

Wasvi: exposed monolithic temple. *See p. 53*



A

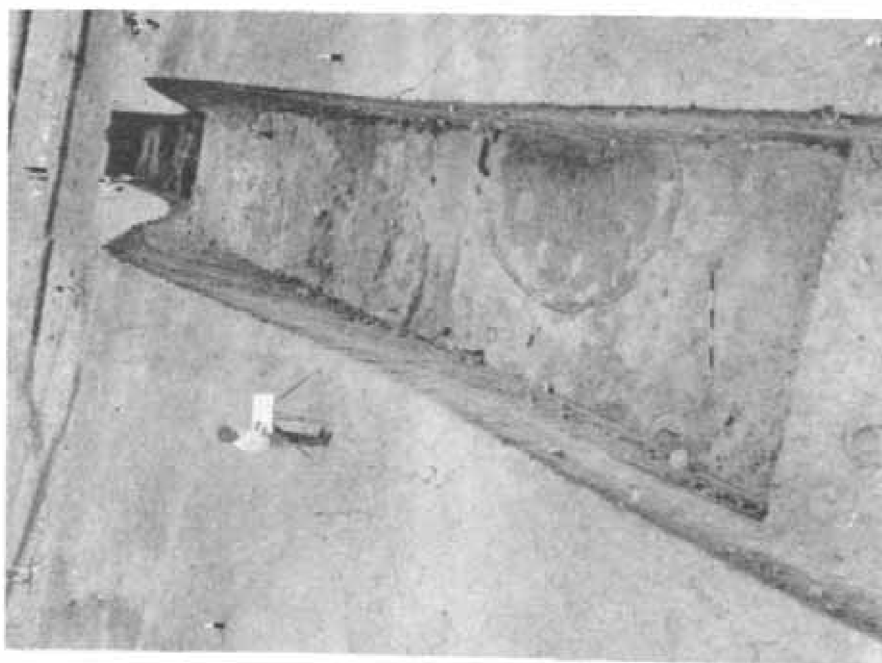


B

Maihar: A, *exposed trench on north-west part;* B, *Acheulian artefacts. See p. 57*



B



A

Adam: A, *section across the habitation, rampart and moat on south;* B, *rampart of Period III and IV. See pp. 63 and 65*



A



B

Adam: A, *circular murram flooring;* B, *U-shaped hearths having segmented fire chamber.* *See p. 63*



A



B

Adam: A, *elliptical structure;* B, *terracotta ring well.* *See p. 65*



C



D

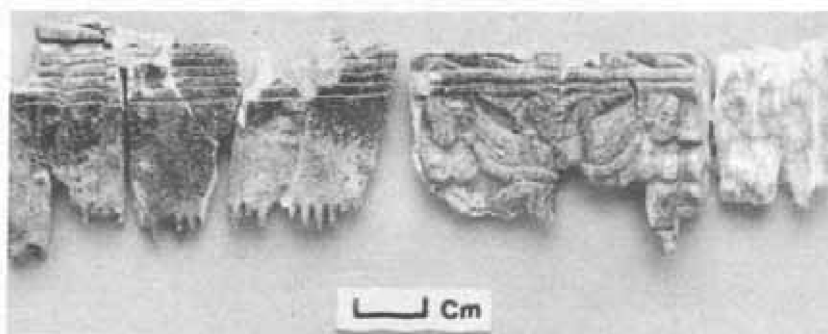


A



B

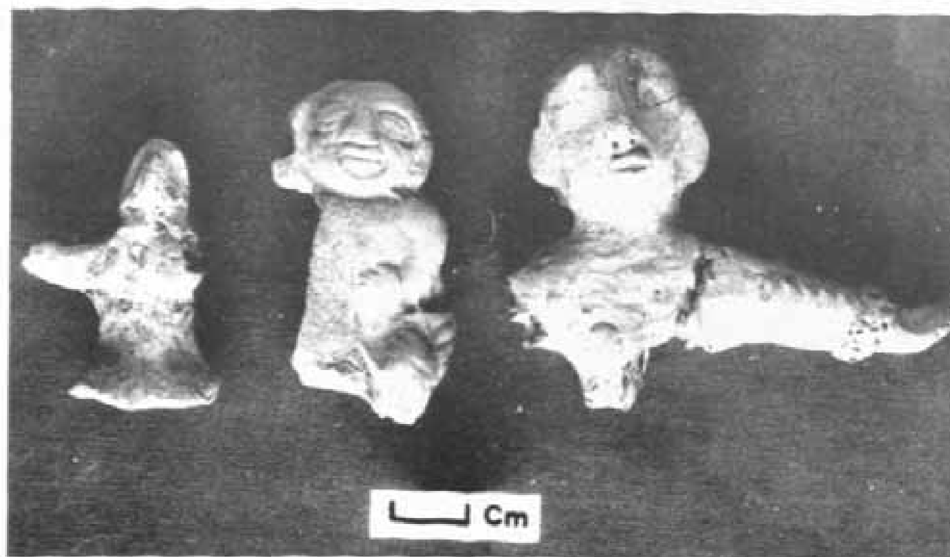
Adam: A, *cast copper coin;* B, *terracotta coin mould;* C-D, *terracotta sealings.* *See p. 68*



A



B

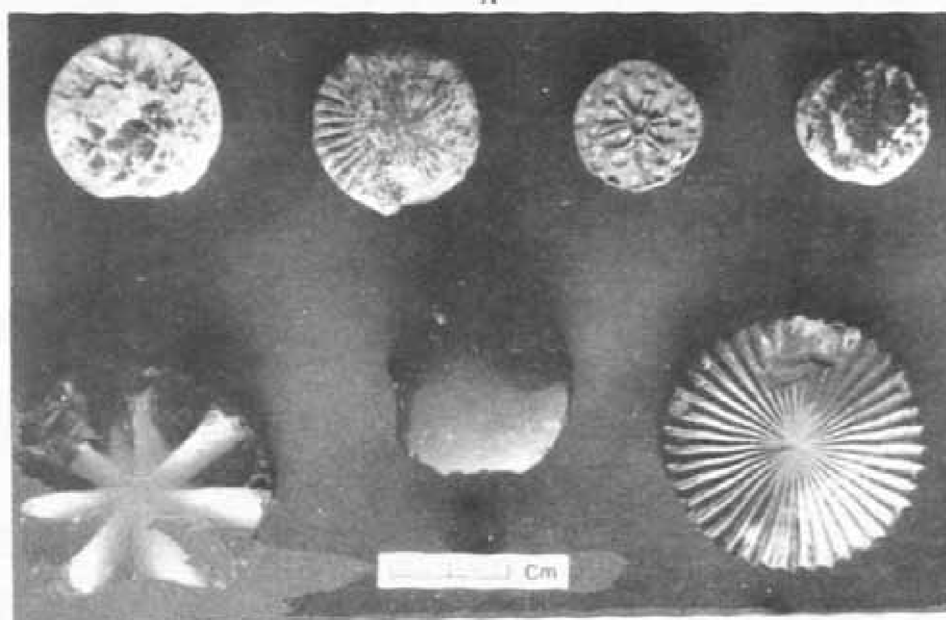


C

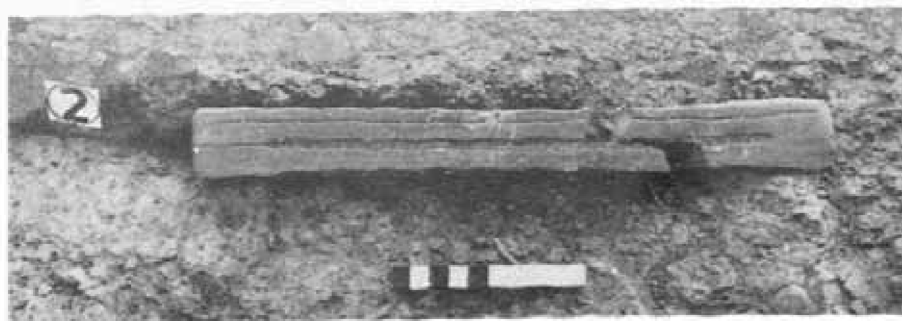
Adam : A, *fragmentary carved bone comb*; B, *Roman silver coin*; C, *terracotta figurines, all Period V*. *See p. 68*



A



B



C

Adam : A, *Yaksha head;* B, *ear-stud;* C, *stone mould, all Period* V. *See p. 68*



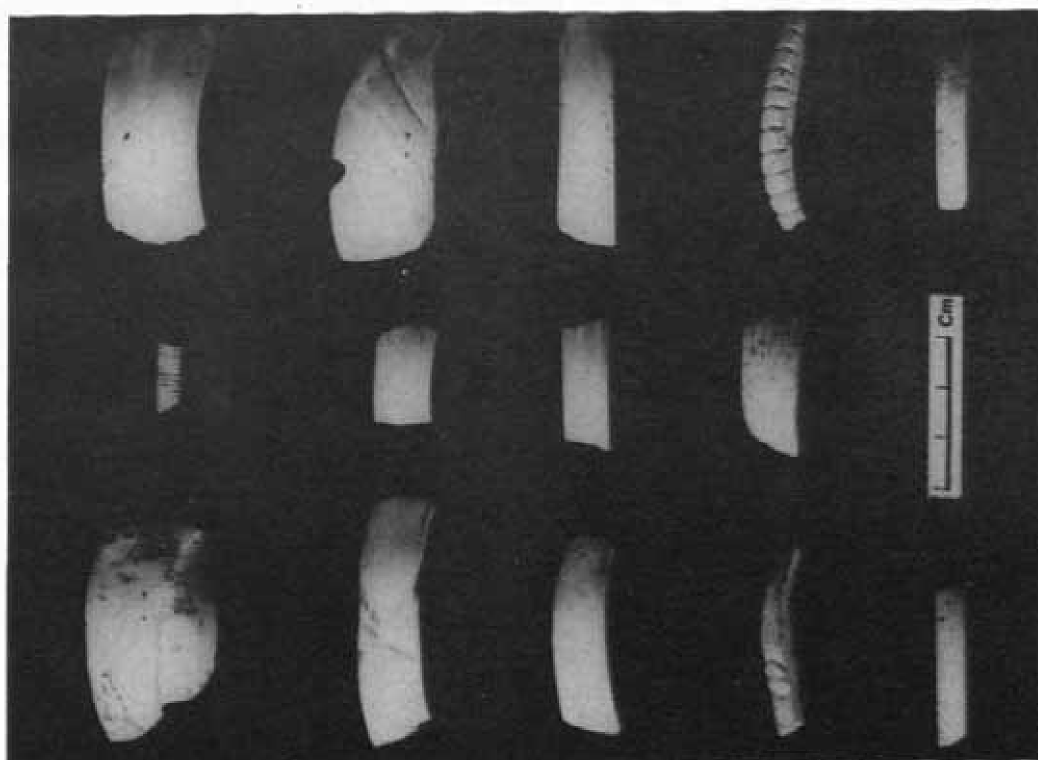
Arambha : exposed section. *See p. 73*



B



C



A

Arambha : A, *fragmentary shell bangles*; B, *inscribed potsherd*; C, *mother goddess*. *See pp. 73-74*



Vadagokugiri : stupa, southern side. *See p. 76*



Vadagokugiri : brick temple, view from north-east. *See p. 78*



B



A

Vadagokugiri : A, *terracotta tile depicting Ganesa;* B, *Brahma. See pp. 78 and 81*



A



B

Barabati fort : A, *exposed temple base* and B, *gate complex on the eastern side. See pp. 83-84*

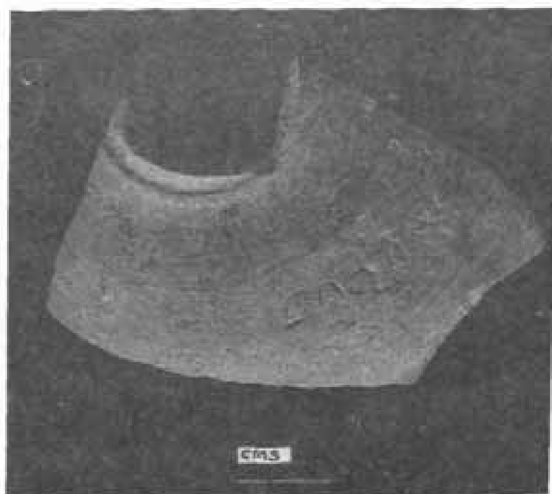


A



B

Lalitagiri : A, *during and* B, *after conservation of monastery* 3. *See p. 85*



A


C


B

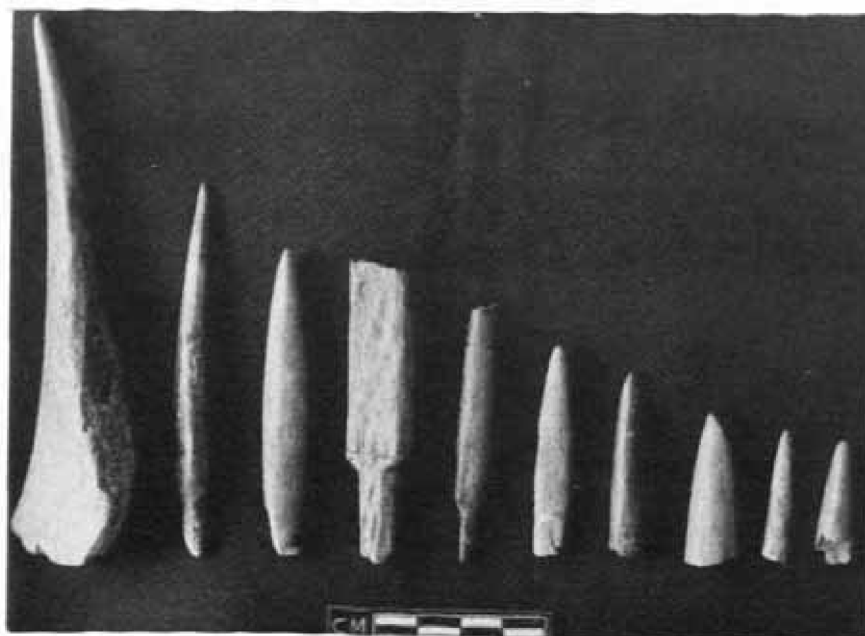


D

Lalitagiri : A, *inscribed sherd* ; B, *Avalokitesvara;* C, *Gajasimha;* D, *fragmentary seal.* *See p. 85*

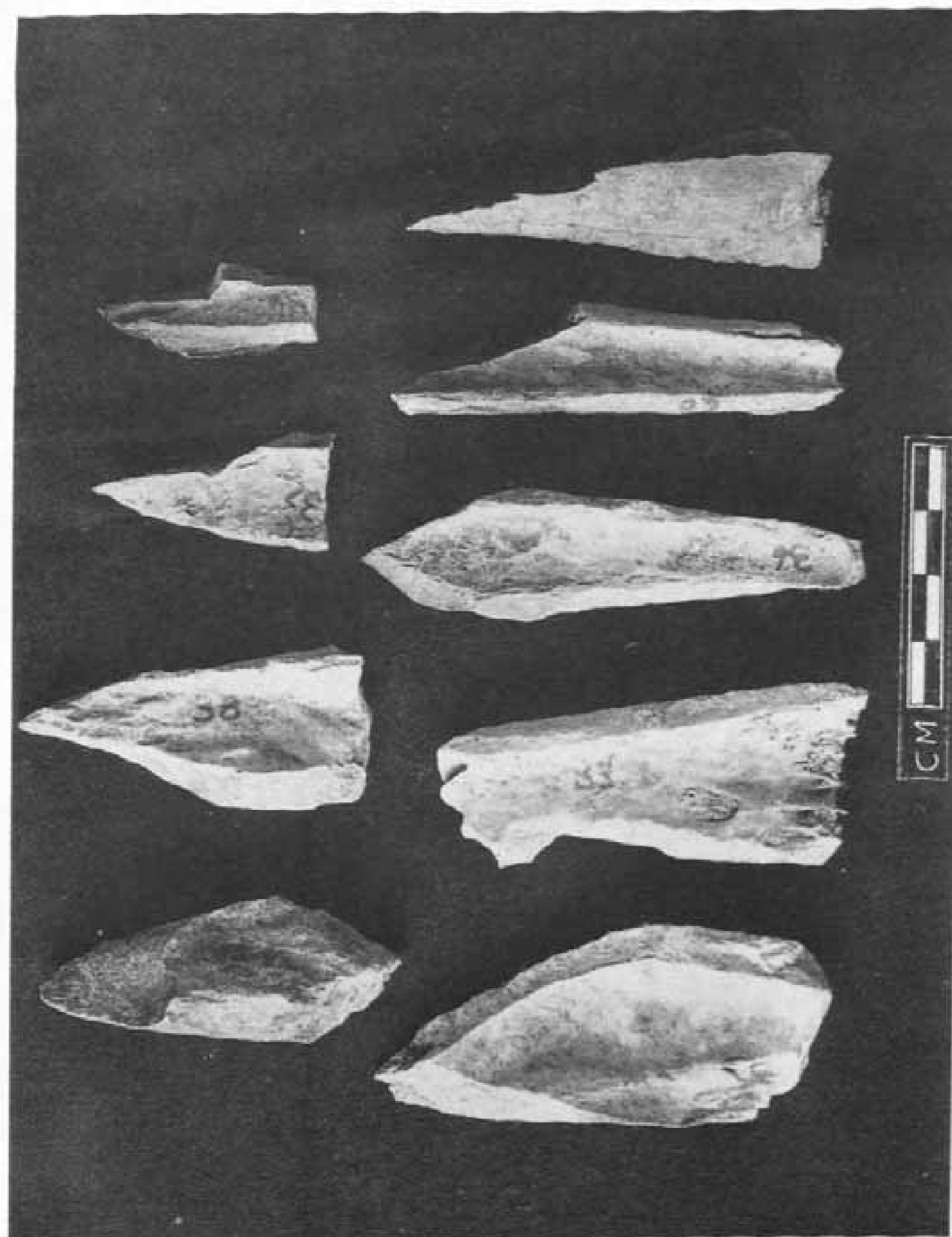


A

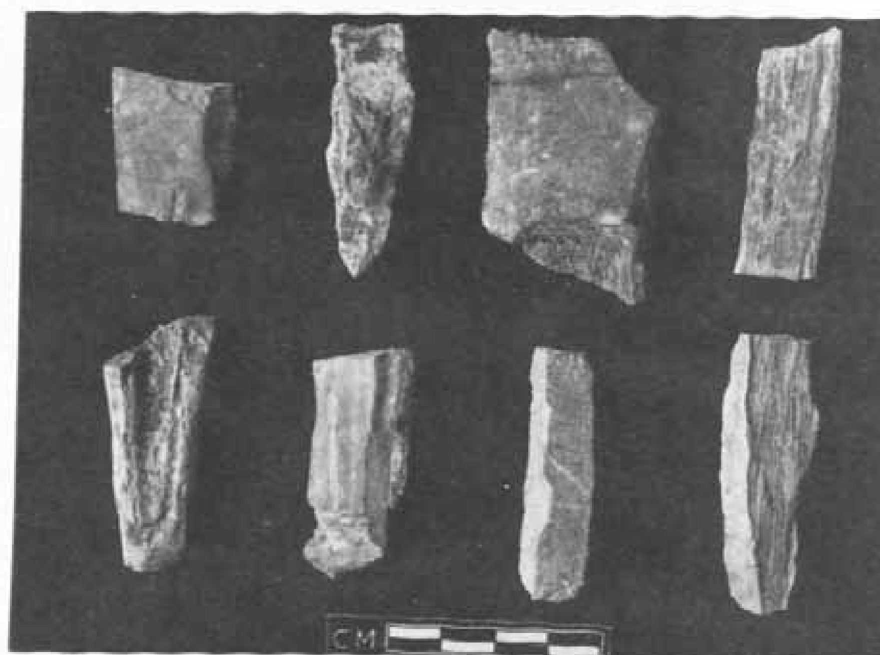


B

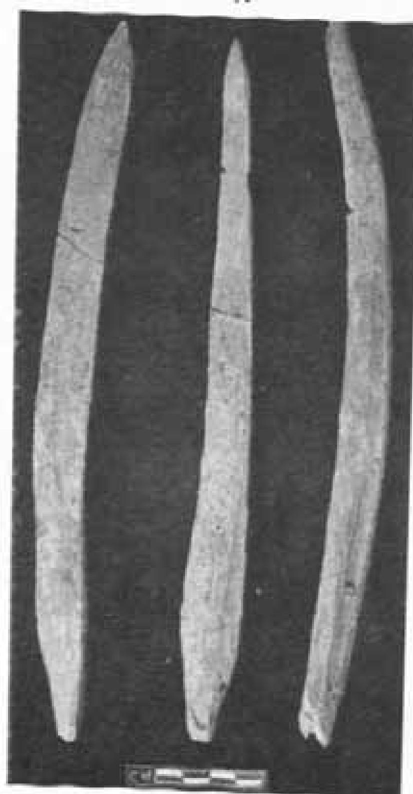
Golbai Sasan: A, *polished stone celts and adzes;* B, *bone arrowheads.* *See p. 87*



Golbai Sasan : crude bone points, *See p. 87*



A



B

Golbai Sasan : bone; A, *parallel sided blades and* B, *spear heads. See p. 87*

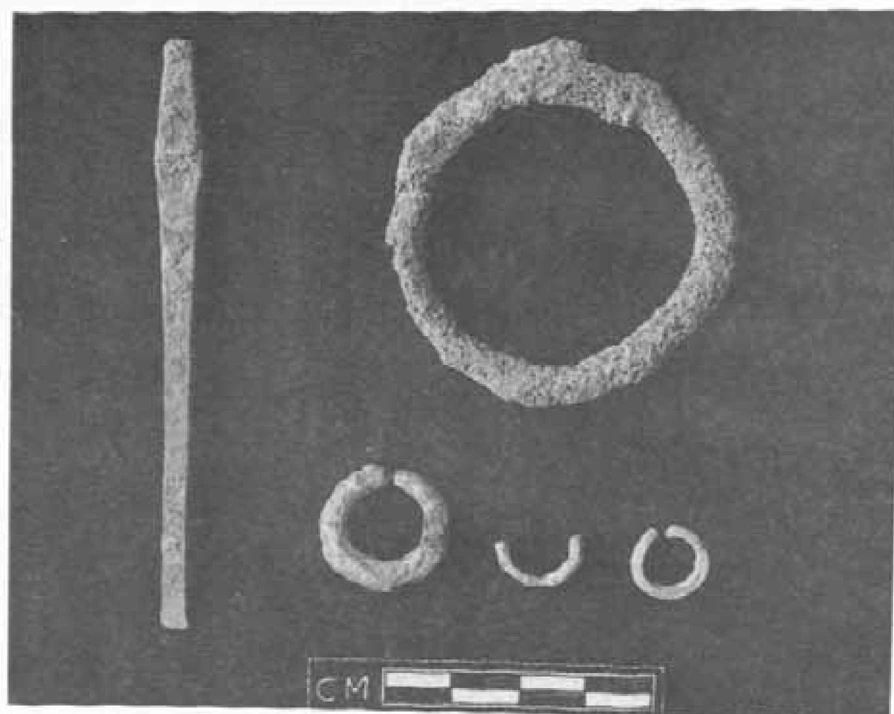


A



B

Golbai Sasan : A, *bone earstuds and pendant ;* B, *terracotta spindle- whorls.* *See p. 87*



A



B

Golbai Sasan : A, *copper objects and* B, *stone, iron and bone celt and adzes.* *See p. 87*

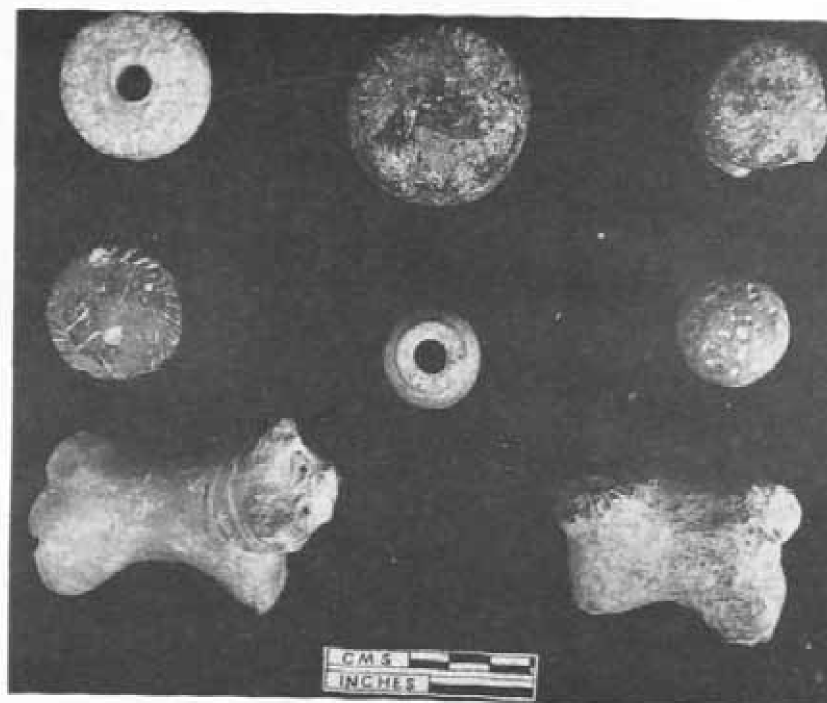


A

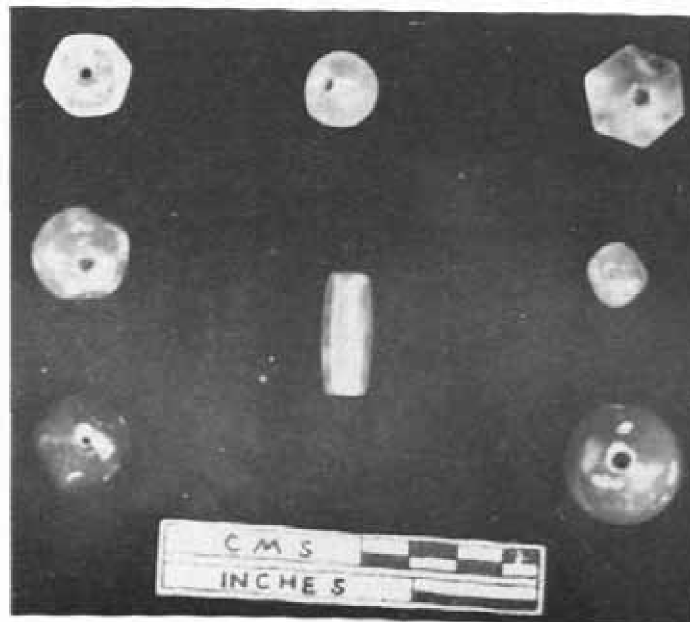


B

Arikamedu : A, *roof tiles and* B, *exposed trench AV 92-XI.* *See p. 90*

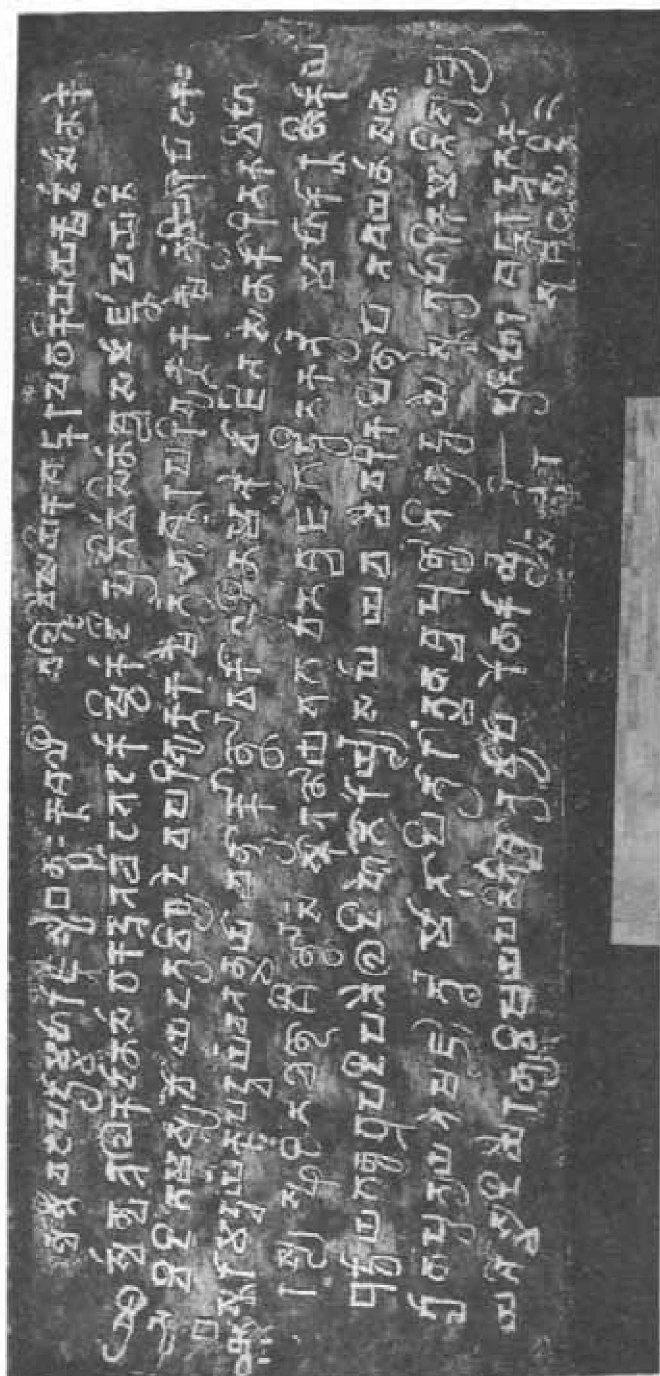


A



B

Inayatpur : A, *terracotta objects and* B, *semiprecious stone beads.* *See p. 98*

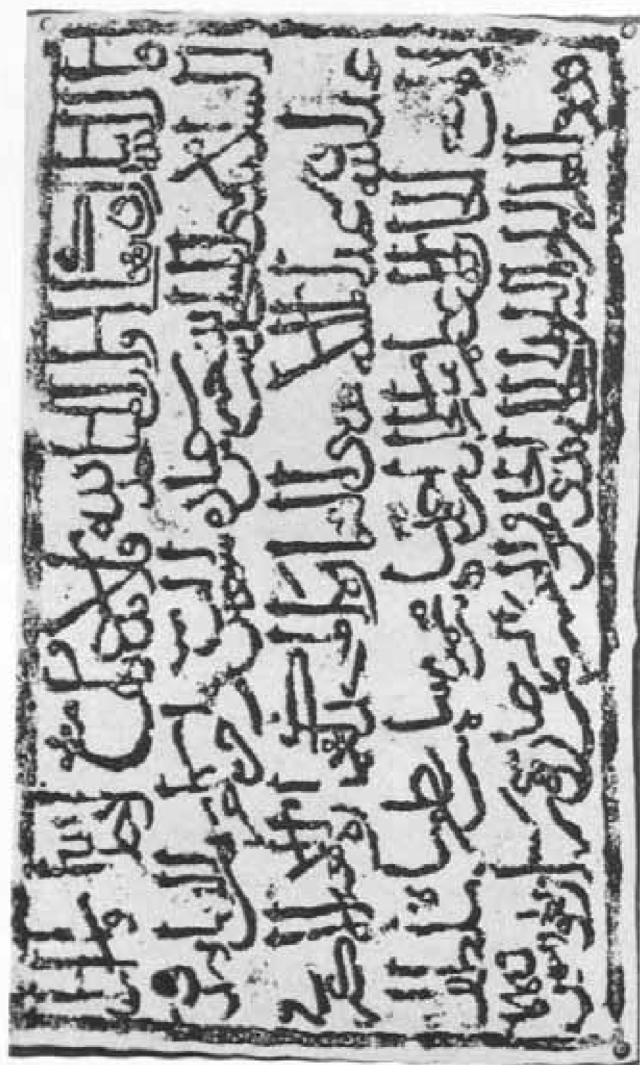


A

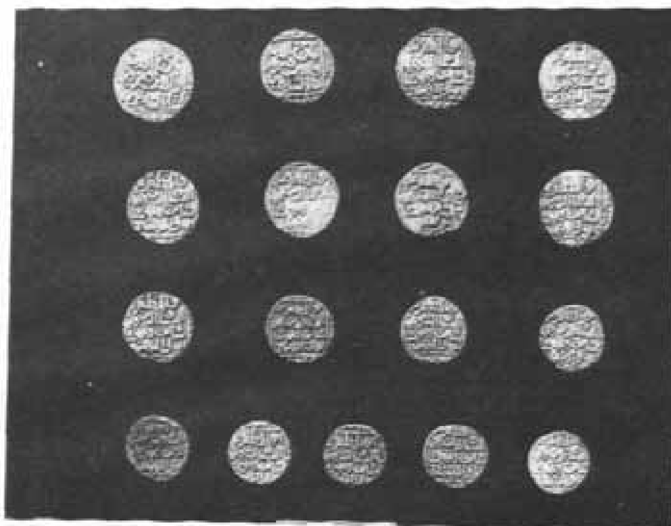


B

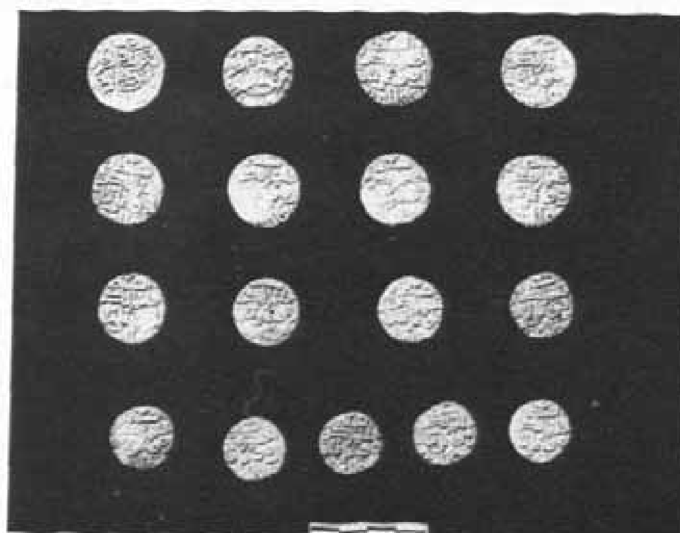
A. *Bagh caves : copper-plate inscription;* B, *Sanchi : votive inscription from stupa 2.* *See p. 116*



Prantij: inscription of Mubarak Khan, Sultan of Gujarat. *See p. 119*



A



B

Bidar: gold coins. See p. 121



A



B



C

Image of Vishnu: A, *from Dhaniakhali and* B-C, *from English bazar.* *See p. 122*



A



B

Malda : navagraha panels. See p. 122



A



B

A, Government Museum, Almora : image of Ganesa ; B, Government Museum, Mathura: carved parasol in red sandstone. See pp. 142 and 146



Bhagor : Siva temple, view from south-west. *See p. 148*

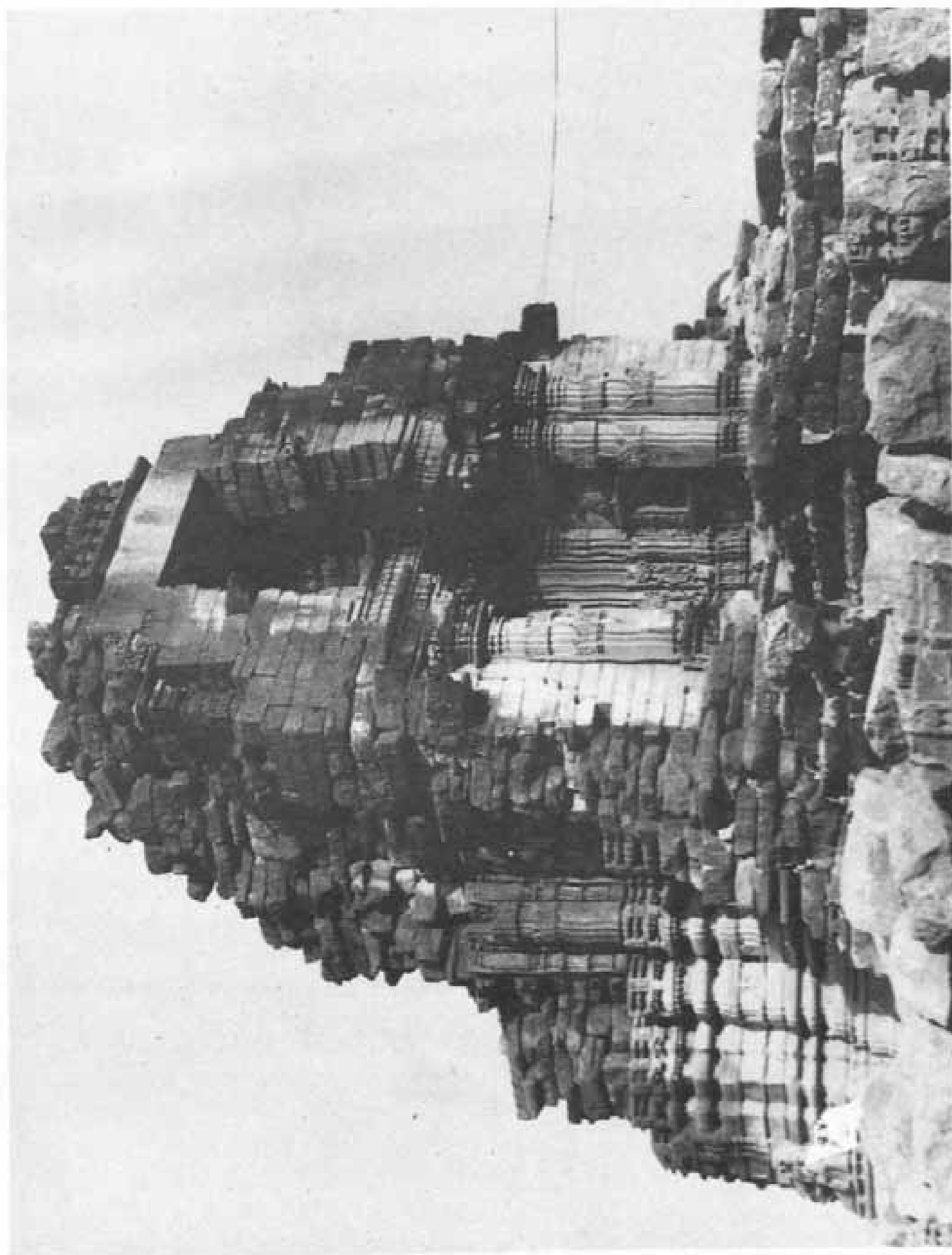


A

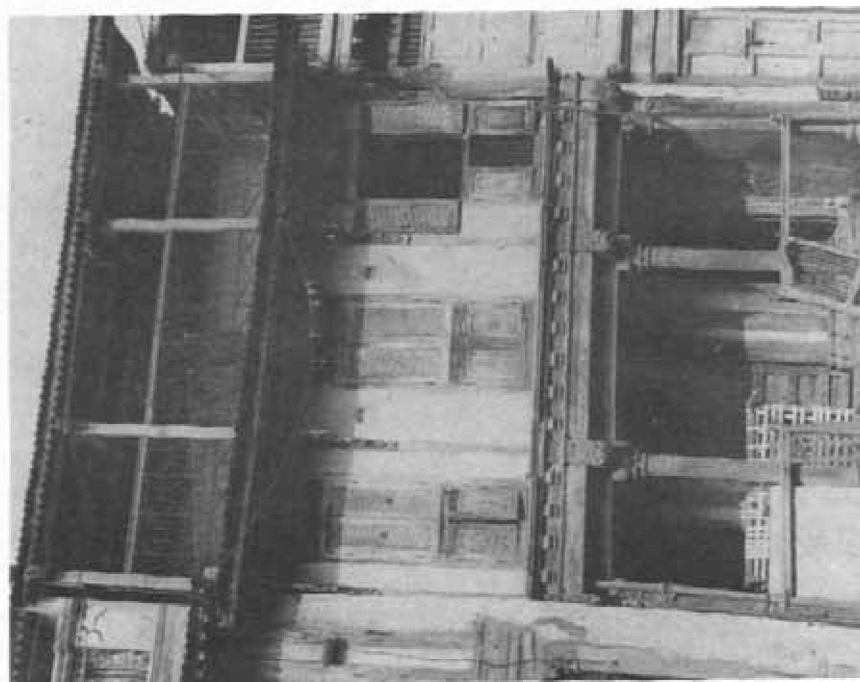


B

Pithanpur : A, *standing Jaina Tirthankara and* B, *seated image of Ambika.* *See p. 149*



Deoria : Siva temple, general view from east. *See p. 150*

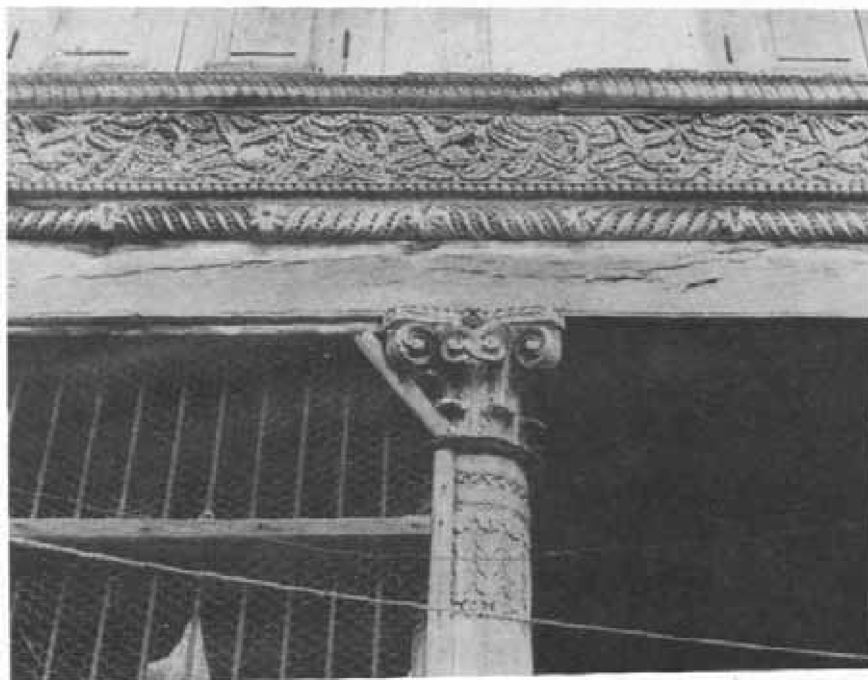


B



A

Pethapur : exquisitely carved wooden structures. See p. 154

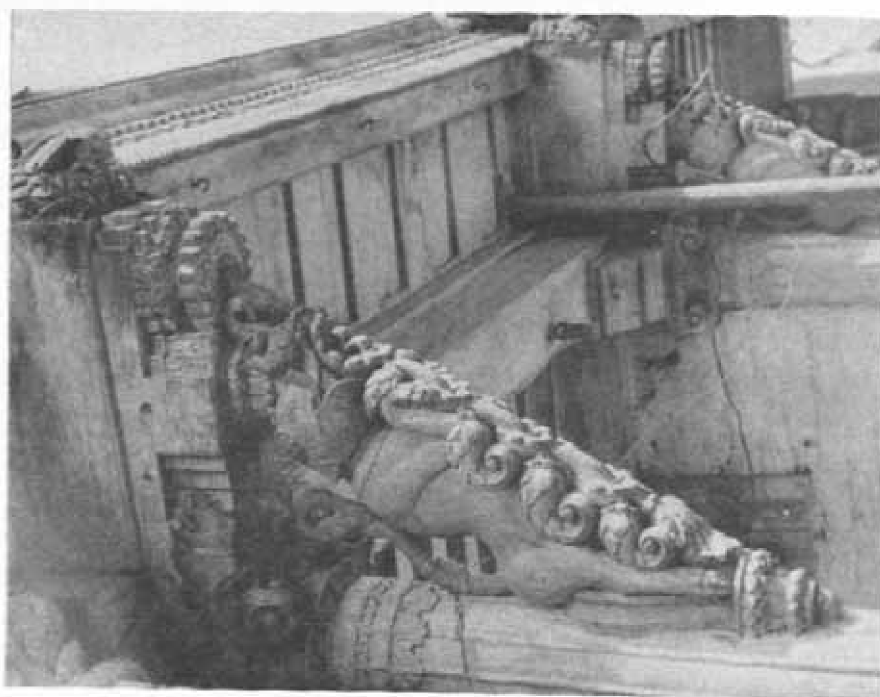


A

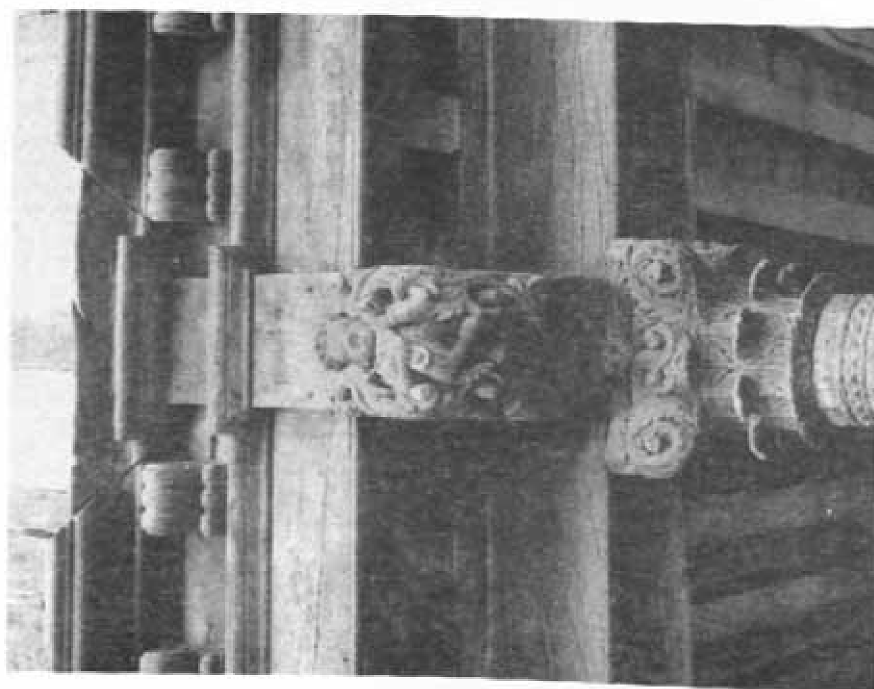


B

Pethapur : wooden pillars exhibiting intricate carvings. *See p. 154*

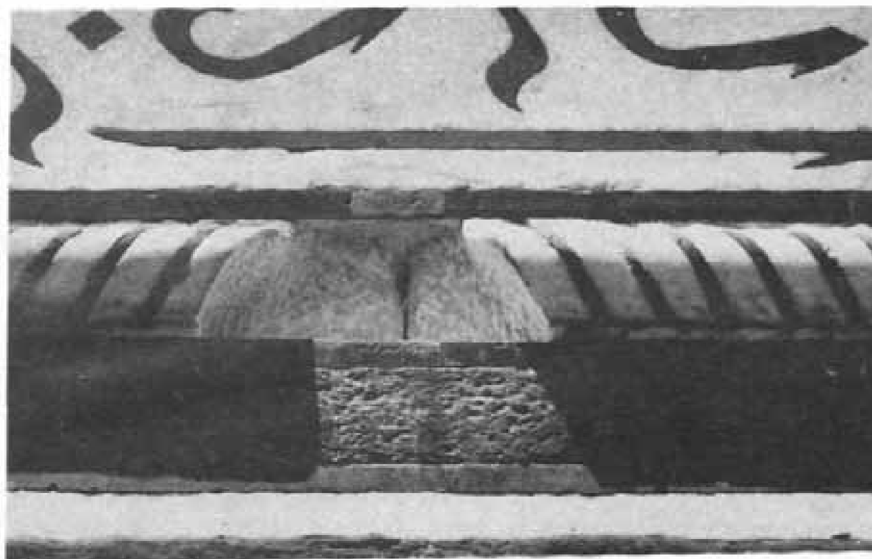


B



A

Pethapur : supporting beam ends and struts displaying vidyadharas and sardulas. *See p. 154*

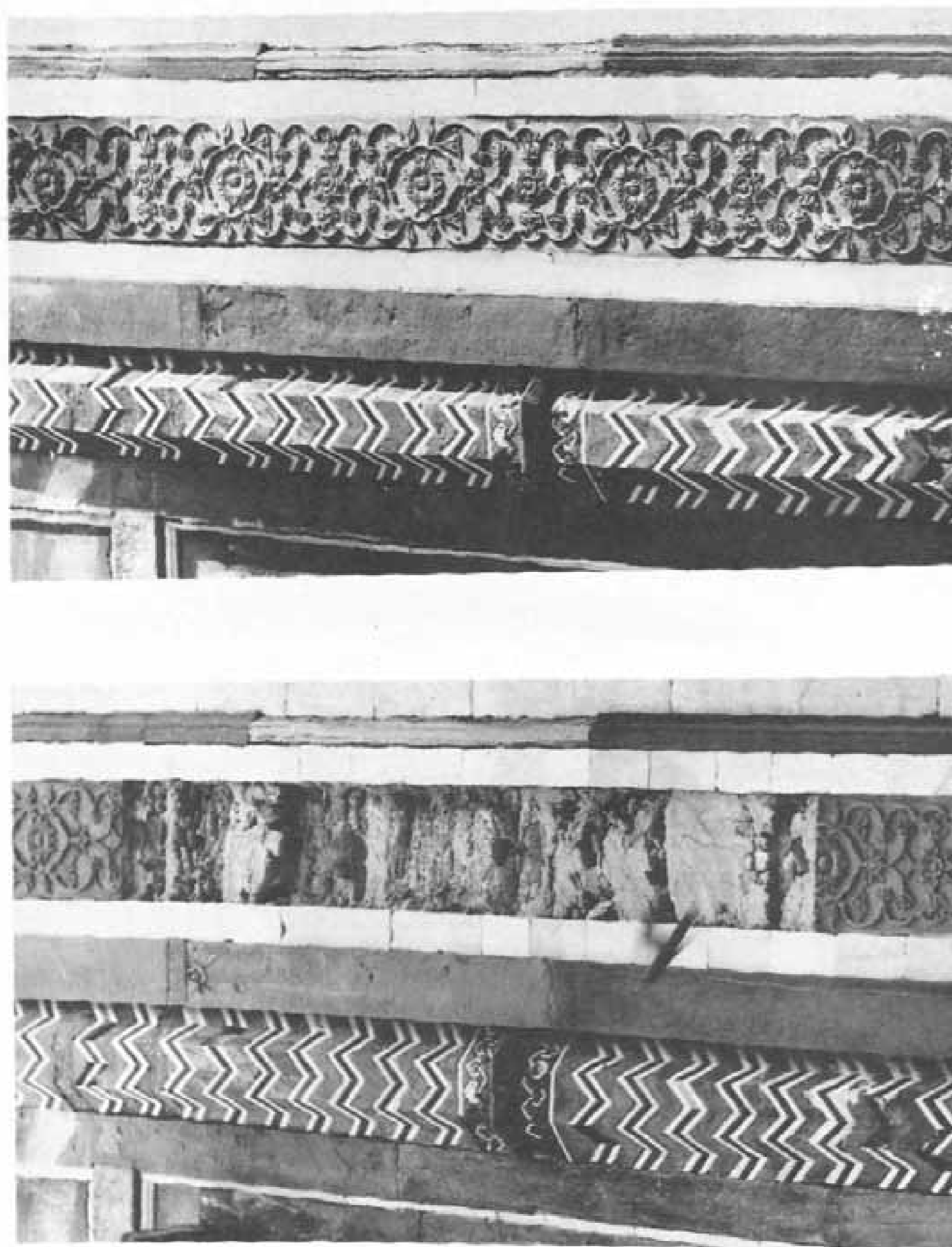


A



B

Taj Mahal, Agra : A, *before and* B, *after restoration of carved stone panel of Mehman Khana.* *See p. 158*



A B

Taj Mahal, Agra : A, before and B, after replacement of stone panel of main gate. *See p. 158*



A

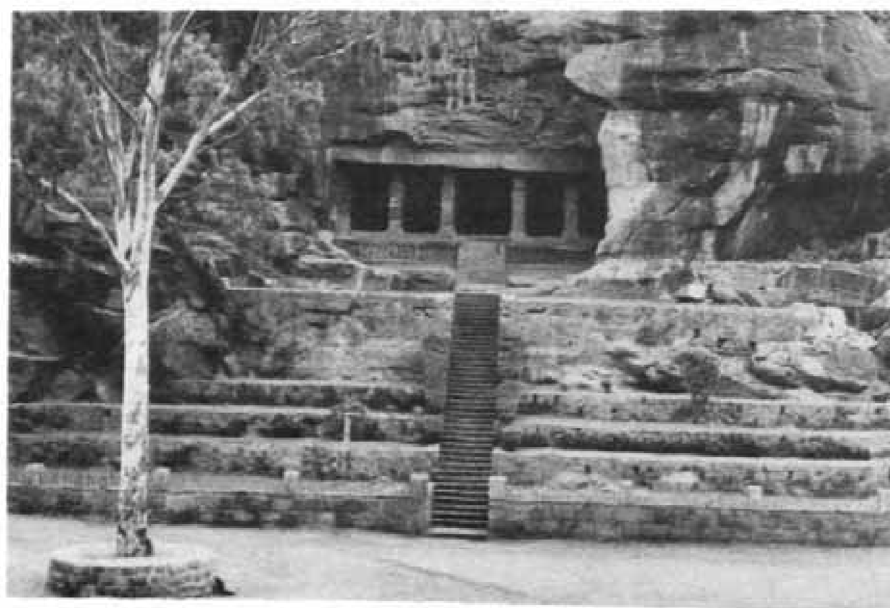


B

Ukhadeshwar temple, Ukhadpimpri : A, *before and* B, *after reconstruction of wall.* *See p. 161*

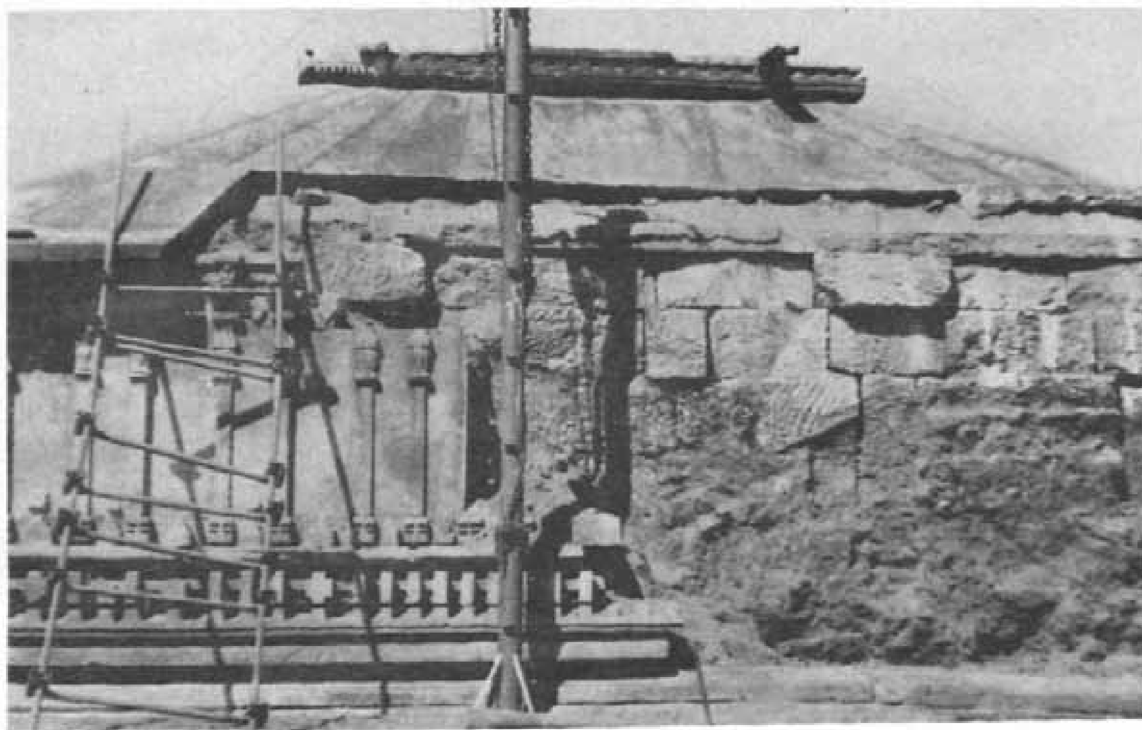


A

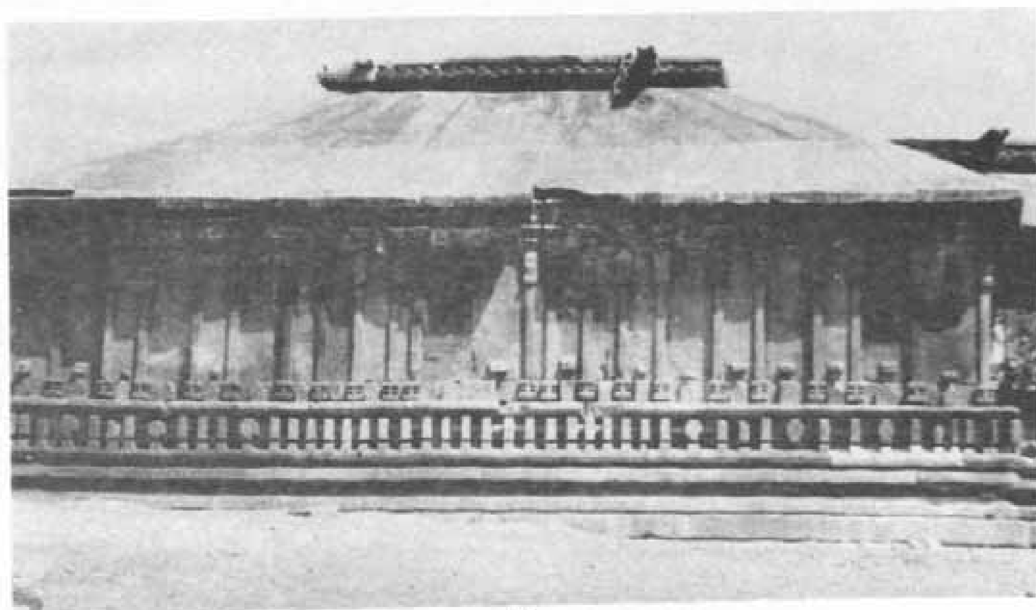


B

Jaina and Vaishnava caves, Badami: A, *before and* B, *after conservation.* *See p. 164*



A



B

Viranarayana temple, Belavadi: A, *before and* B, *after conservation of mandapa.* *See p. 164*



A



B

Vidyasankara temple, Sringeri: A, *before and* B, *after conservation. See p. 164*

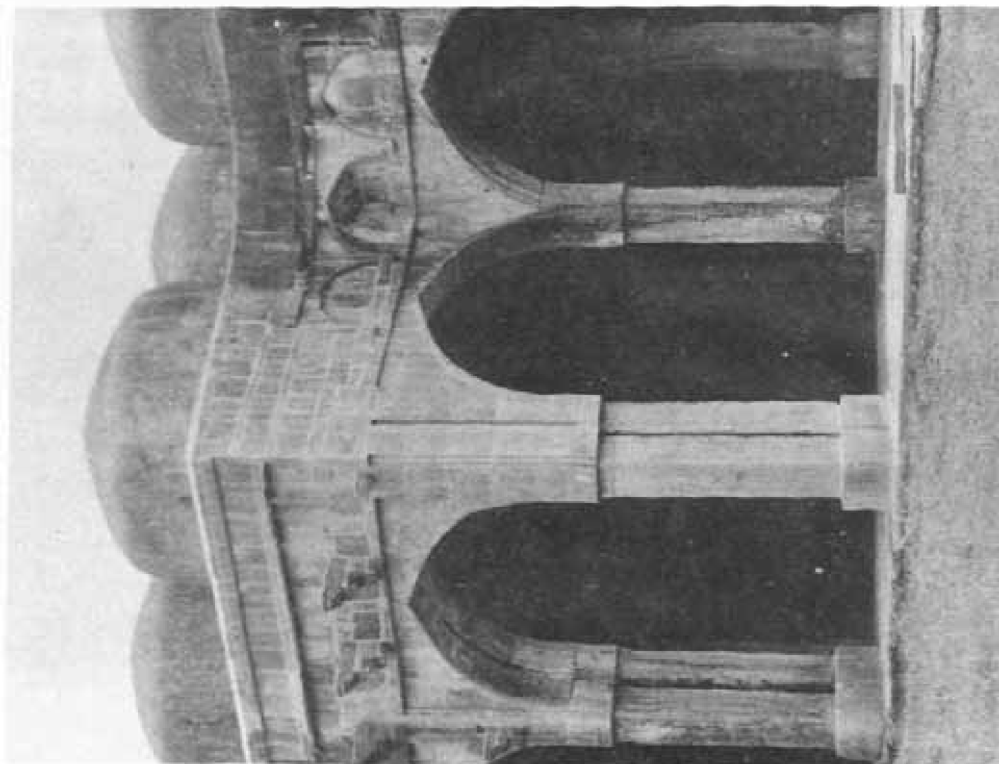


A

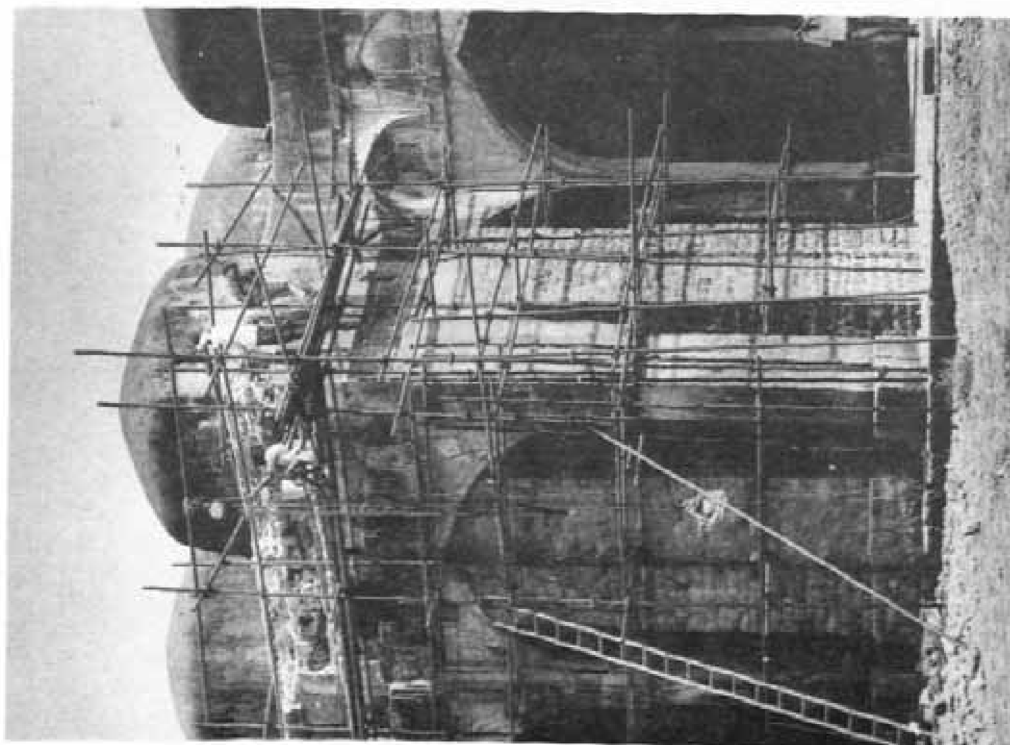


B

Kadaresvara temple, Halebid: A, *before and* B, *after conservation. See p. 165*



B

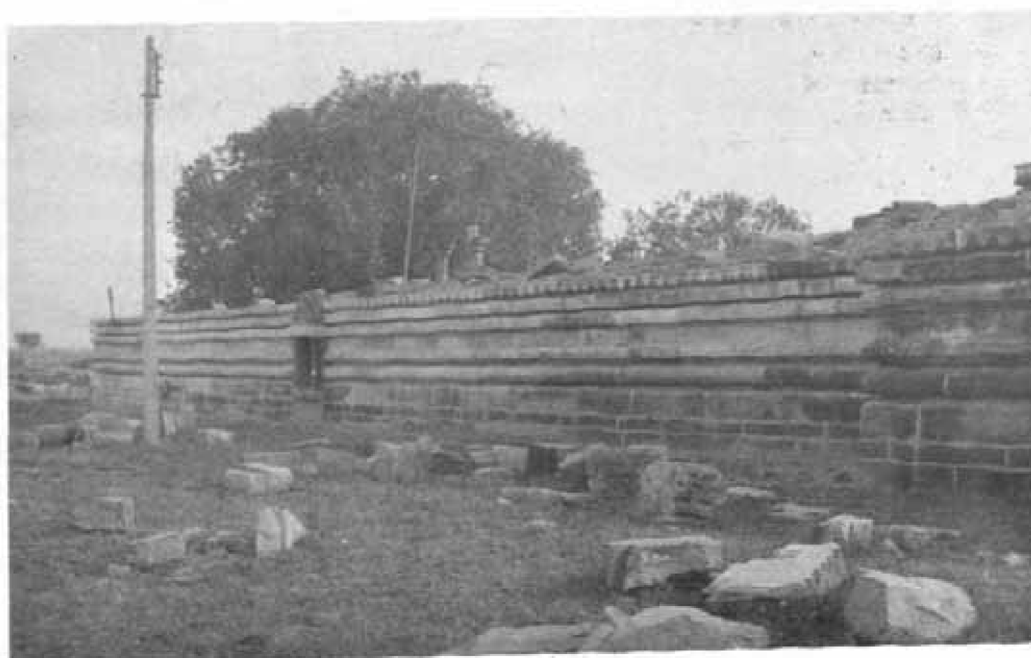


A

Jama Masjid, Mandu: A, during and B, after conservation. *See p. 167*



A



B

Kakamath temple, Suhania: A, *during and* B, *after repairs of jagati.* *See p. 168*

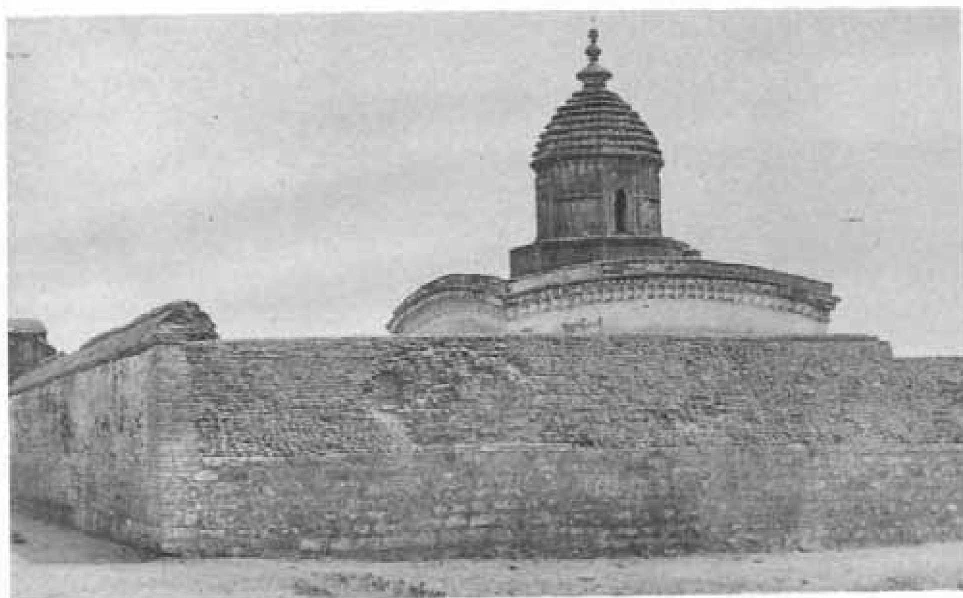


A

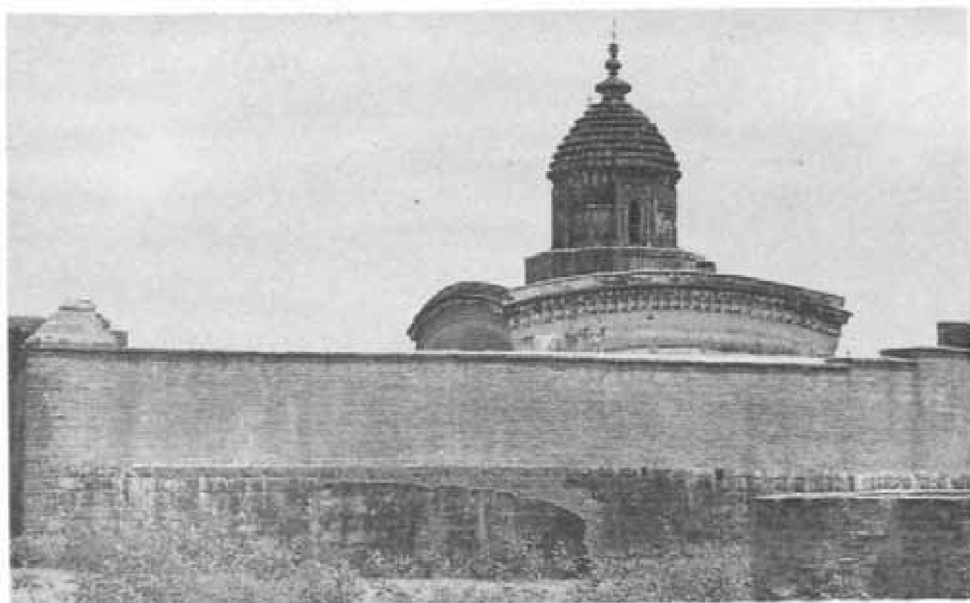


B

Nilamadhava and Siddheswara temples, Gandharadi: A, *before and* B, *after conservation. See p. 171*

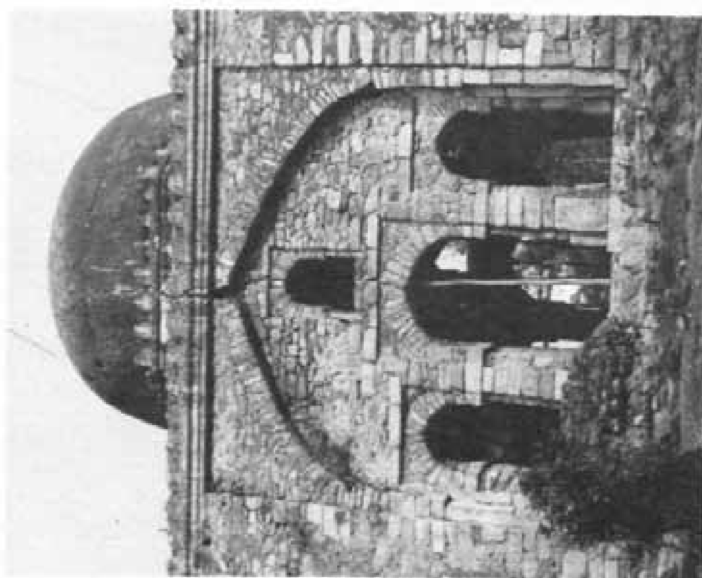


A

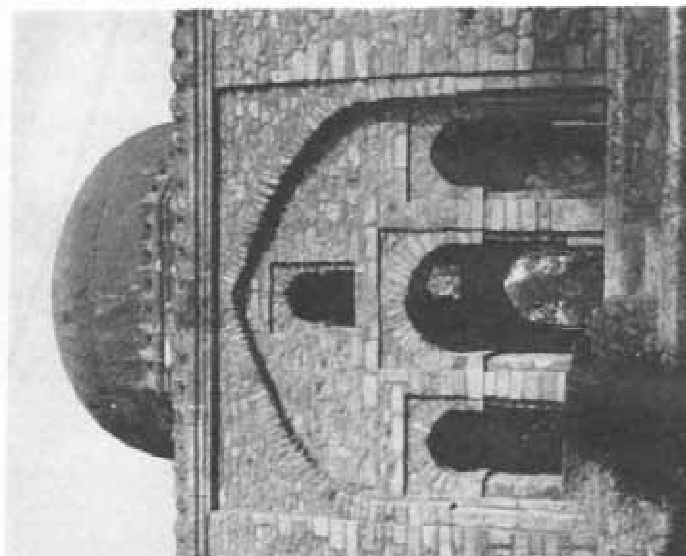


B

Lalji temple, Bishnupur: A, *before and* B, *after restoration.* *See p. 172*

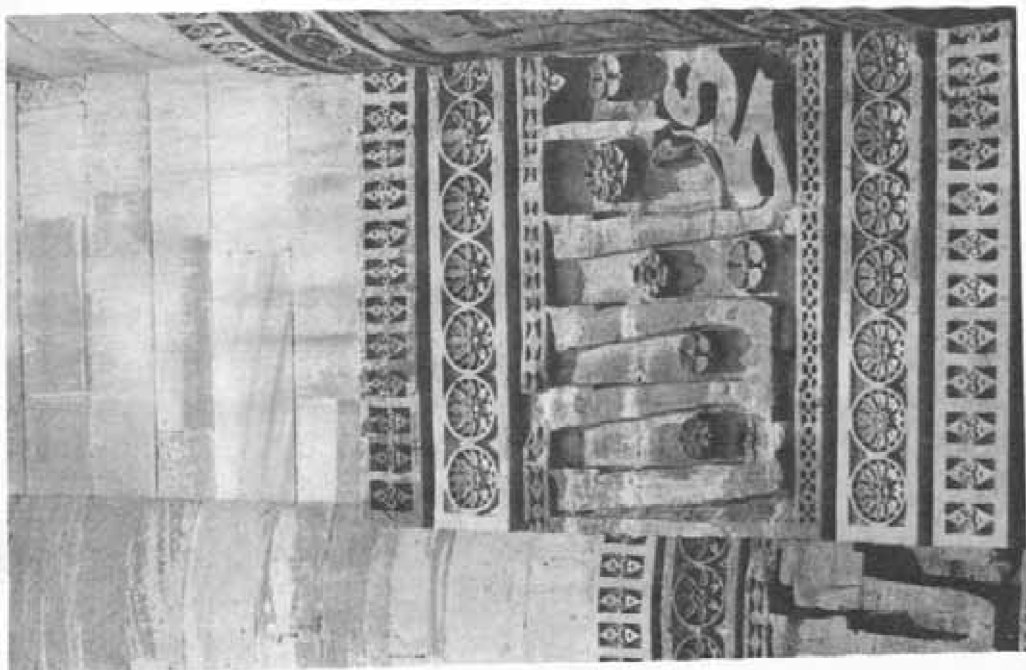


A

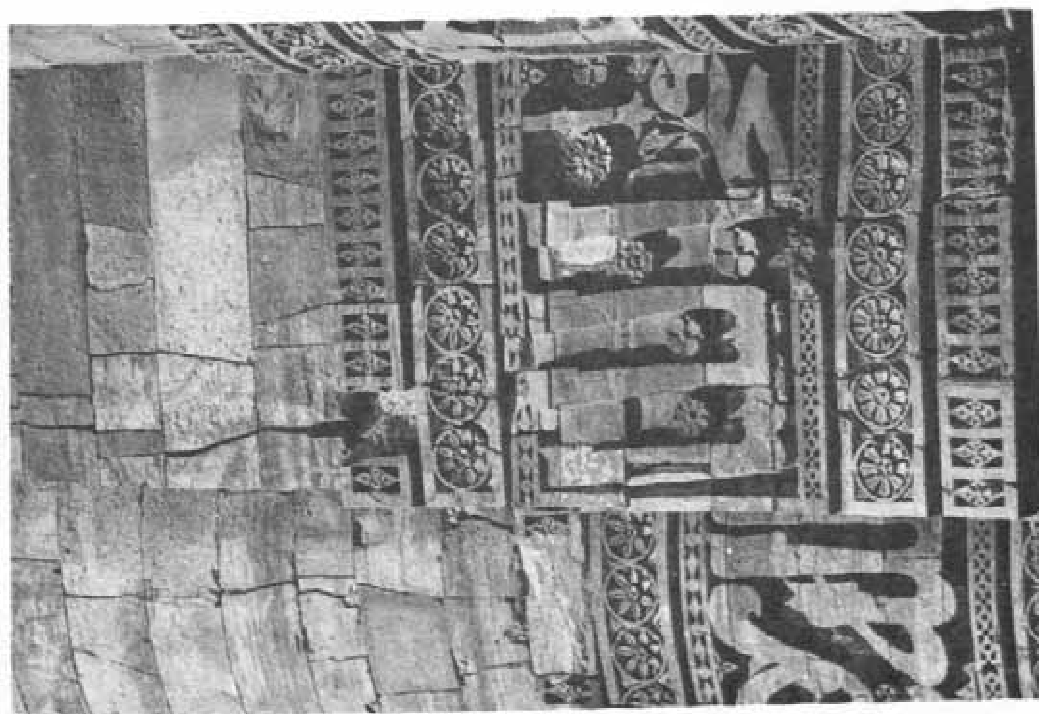


B

Bara-Khamba, Hauz Khas, New Delhi: A, *before* and B, *after conservation of façade and dome. See p. 174*



B



A

Qutb Minar, New Delhi: A, before and B, after conservation. *See p. 174*



A



B

Kotla Feroz Shah, New Delhi: A, before and B, after conservation of retaining wall. *See p. 174*



A



B

Bazar, Bhangarh: A, *before and* B, *after conservation.* *See p. 178*



A



B

Dutch fort and cemetery, Sadras: A, *before and* B, *after conservation. See p. 181*

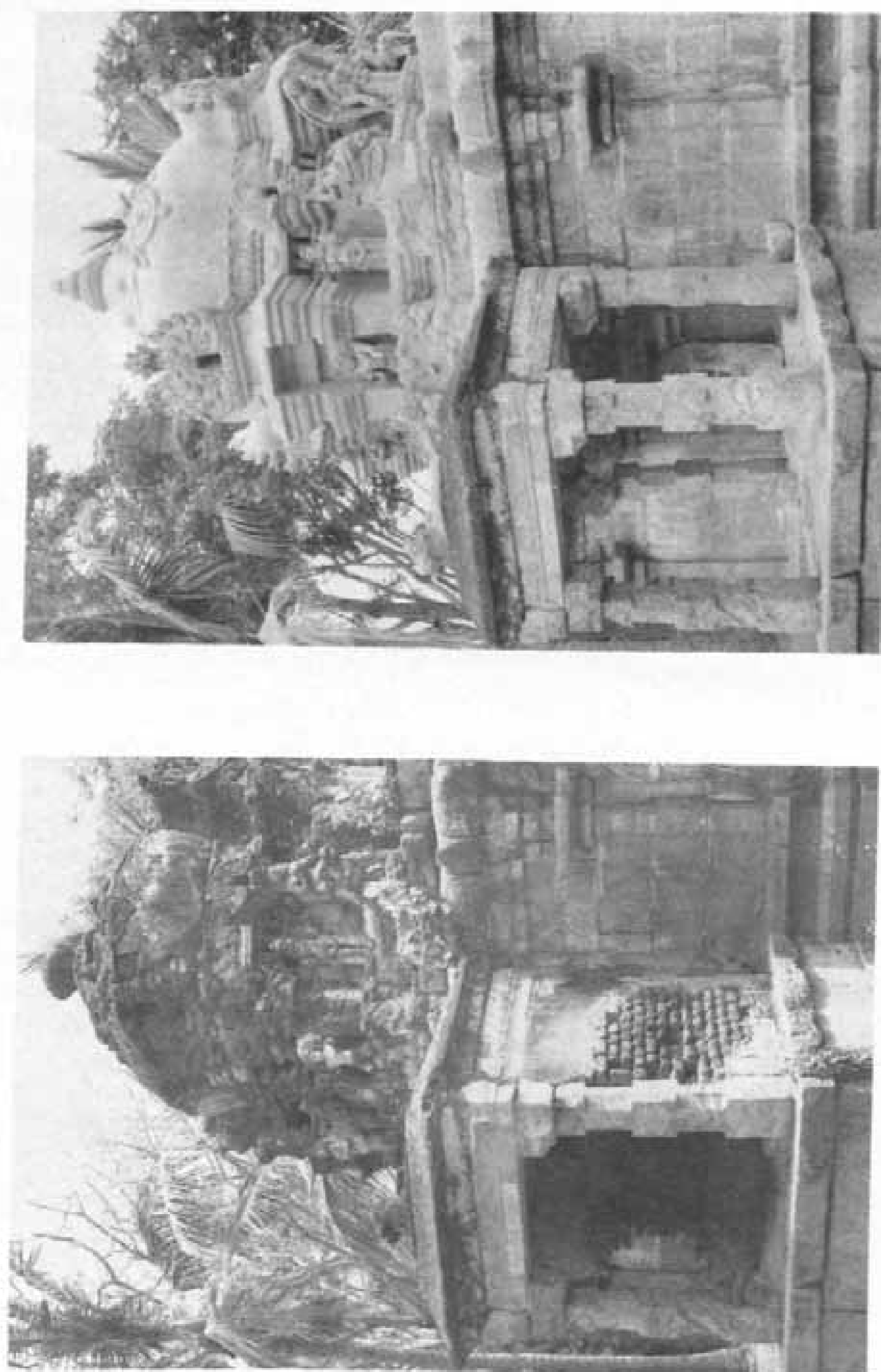


A



B

Muchukundesvara temple, Kodumbalur: A, *before and* B, *after conservation.* *See p. 183*



A B

Siva temple, Tennangudi: A, *before and* B, *after conservation.* *See p. 163*



A

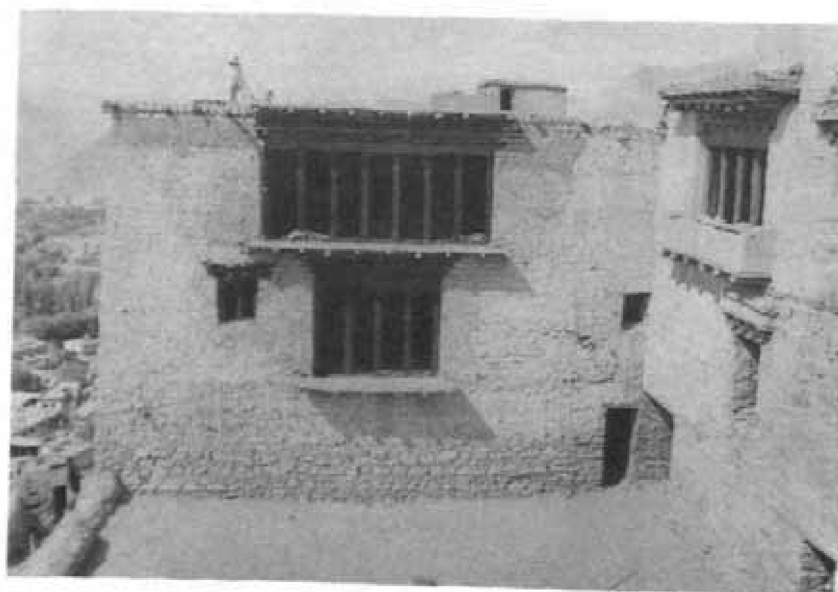


B

Brihadesvara temple, Gangaikondacholapuram: A, *before and* B, *after conservation. See p. 184*



A



B

Palace, Leh (Ladakh) : A, *before and* B, *after conservation.* *See p. 187*



A



B

Stupa, Tisseru (Ladakh): A, *before and* B, *after restoration. See p. 187*



A



B

Dera temple, Babour: A, *before and* B, *after resetting of mandapa.* *See p. 187*

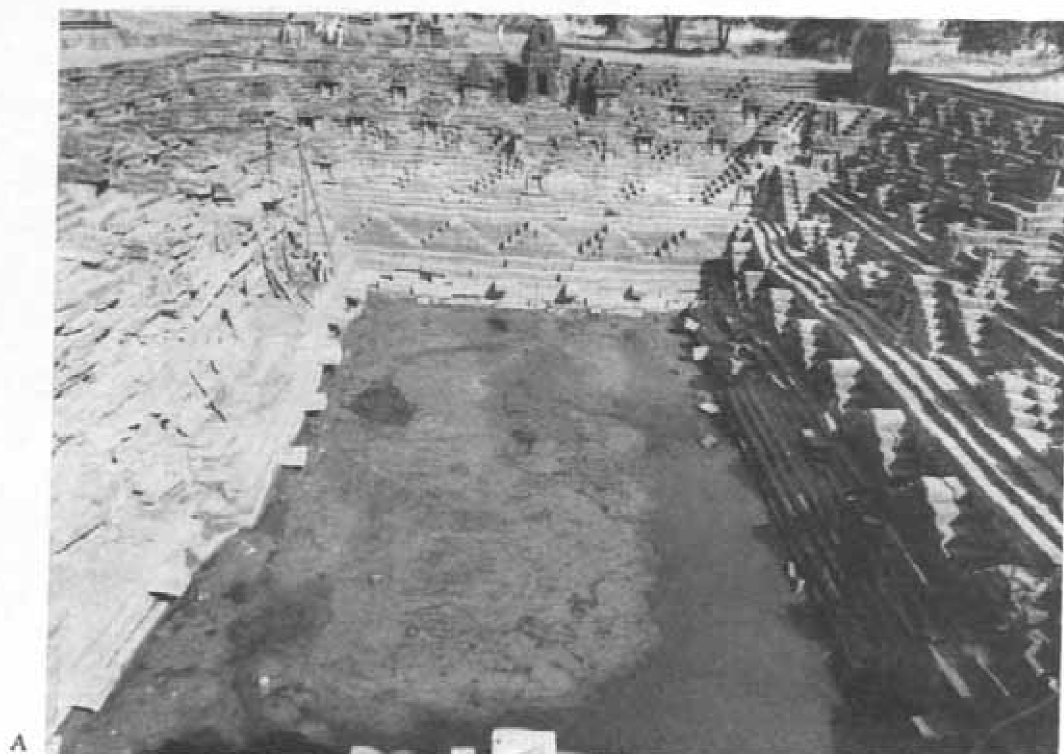


A

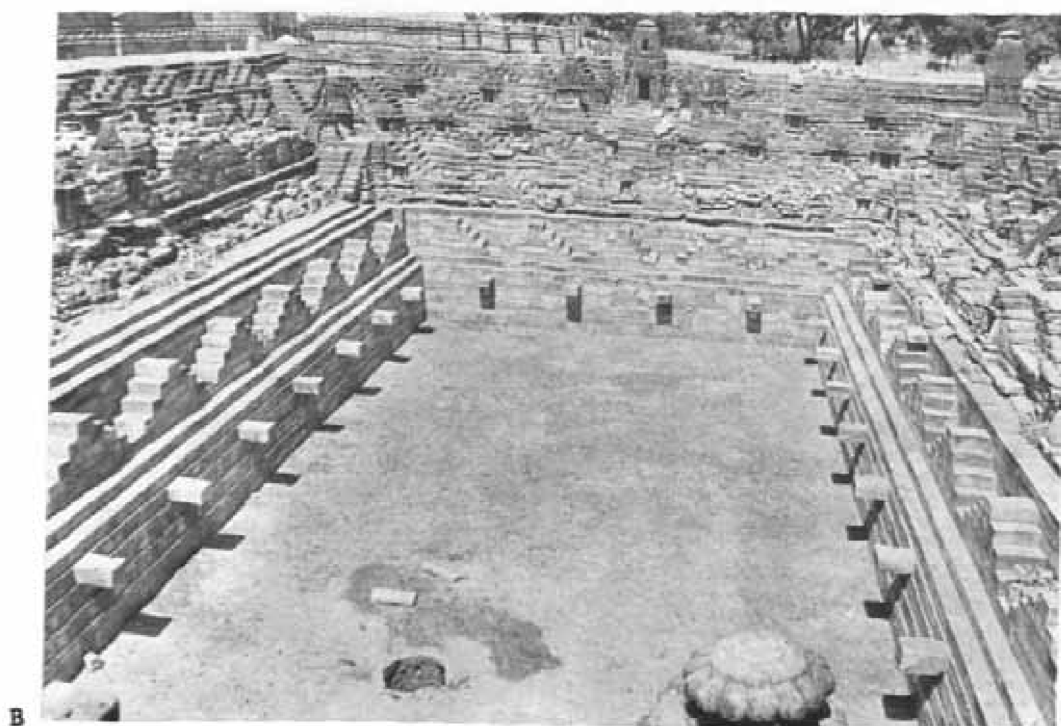


B

Palace, Ramnagar: A, *before and* B, *after repairs to the retaining wall between Newa Mahal and Sheesh Mahal.* *See p. 187*



A



B

Surya Kund, Modhera: A, *before and* B, *after conservation.* *See p. 187*

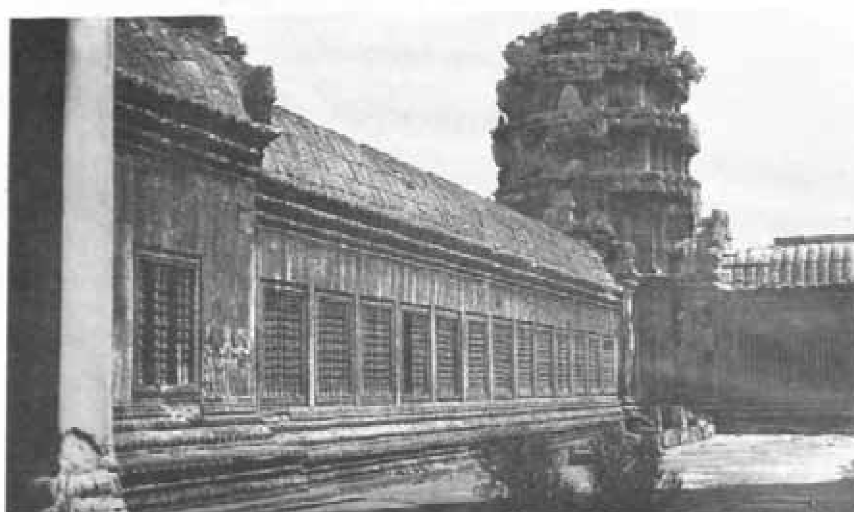


A



B

Angkor Vat: Eastern Wing Gallery on North of Third Enclosure; A, *before* and B, *after conservation of tie-beam.* *See p. 192*

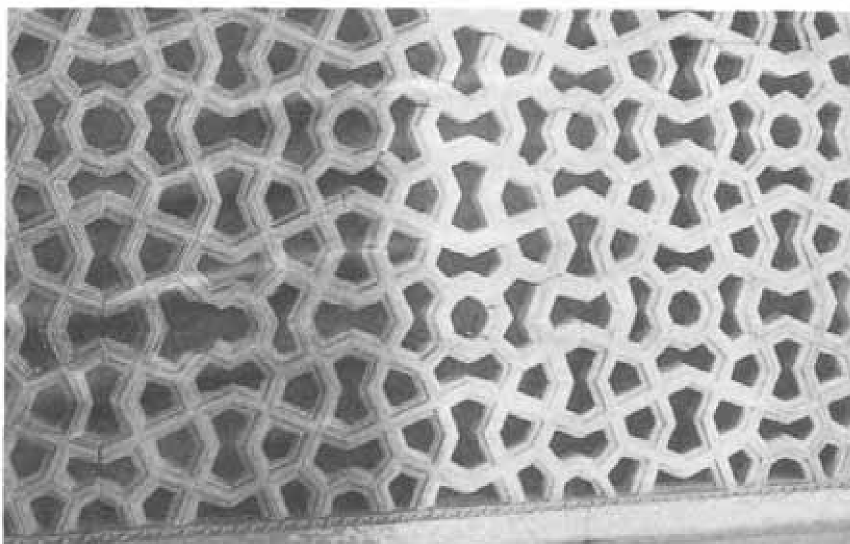


A



B

Angkor Vat: Southern side of East interior wall of Second Enclosure: A, *before and* B, *after chemical treatment.* *See p.* 196



A



B

A, *Humayun's tomb, New Delhi and* B, *Diwan-i-khas, Delhi, during chemical treatment. See pp. 198-199*



A

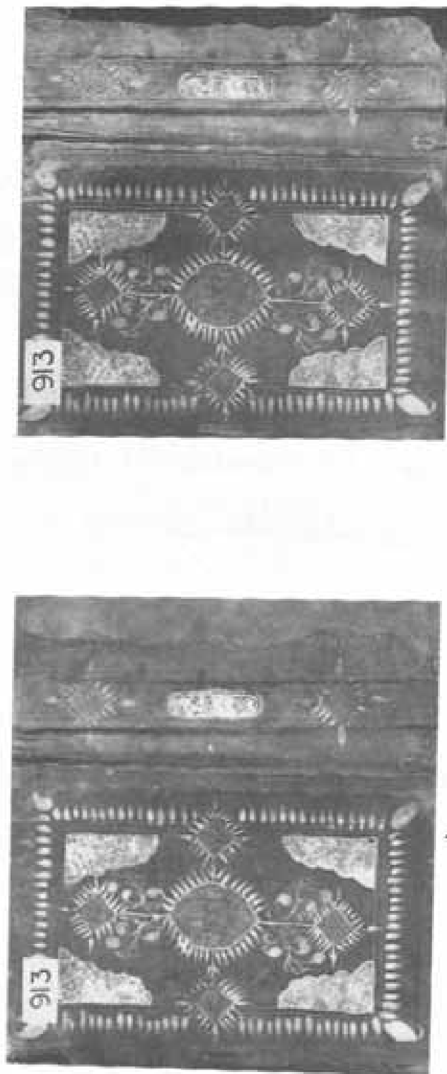


B

Buddhist monasteries, Tabo: A, before and B, after chemical treatment of paining of Dawang gumpha. See p. 202



Itmad-ud-Daula, Agra: during chemical treatment of panel painting inside verandah. *See p. 209*



A B

Archaeological Museum, Bijapur: A, before and B, after chemical treatment of leather wrapper of manuscript. See. p. 211

ARCHAEOLOGICAL SURVEY OF INDIA